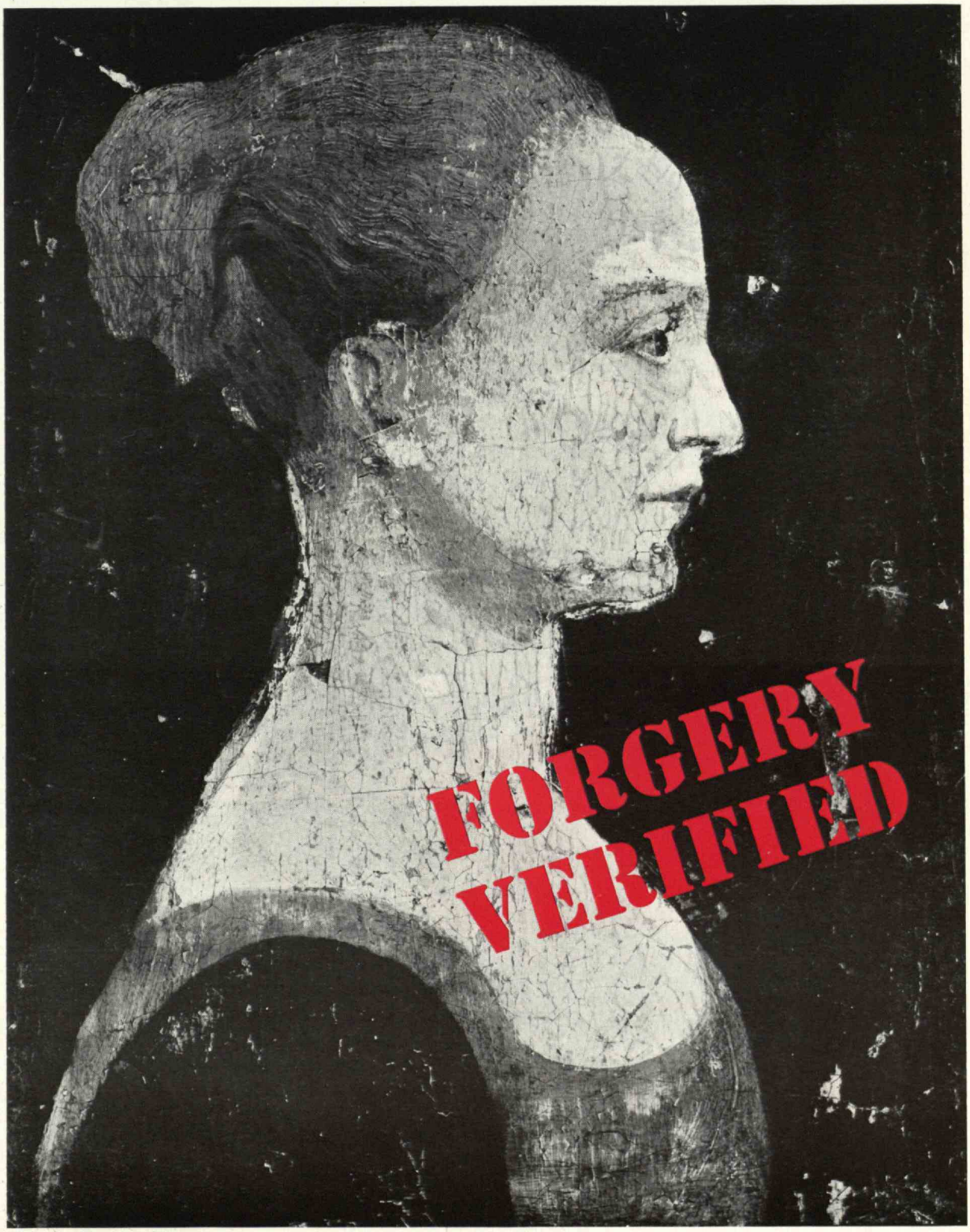
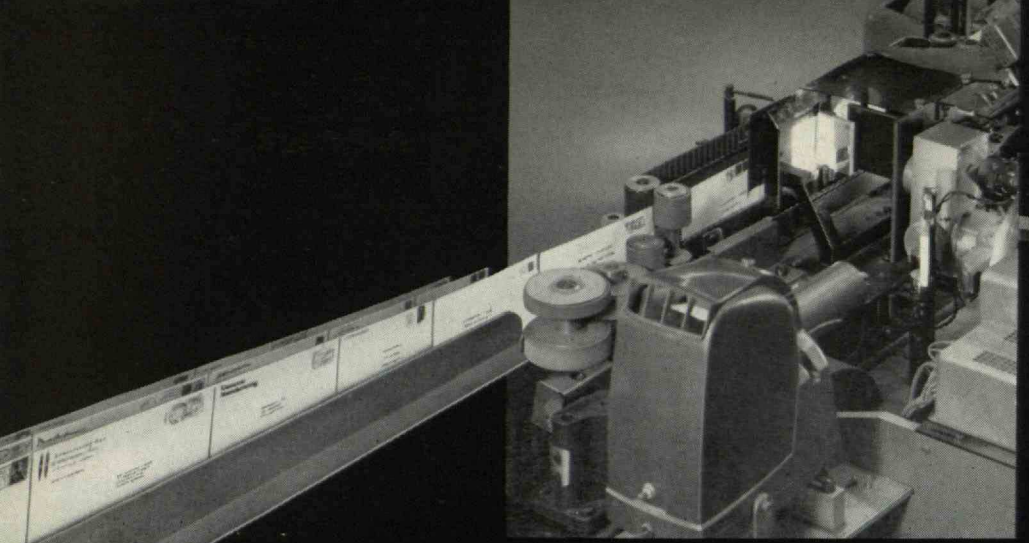
Technology Review

PRIL 1960



technology
review
Published by MIT



wherever there's electronics . . .

there's Transitron

One-day delivery of letters between major cities in the United States is the goal of the Post Office Department. This dramatically improved postal service of the future will be aided by electronic sorting systems which "read" addresses. Electronic optical "scanners" in use or currently being developed are made possible by Transitron's accurate and reliable semiconductors. At Transitron, more than 4500 skilled employees work exclusively to advance the semiconductor art. In computers, missiles, radar, atomic subs, communications, jets and thousands of other commercial and military applications — wherever there's electronics, there's Transitron, leading the field in semiconductor reliability.

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U. S. Post Office Dept.
by Farrington Mfg. Co.,
Needham Heights, Massachusetts

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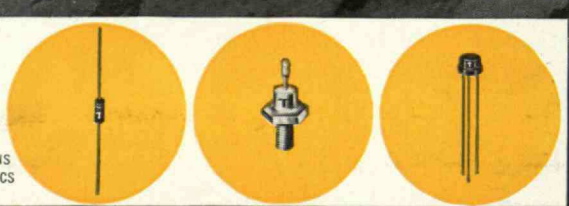

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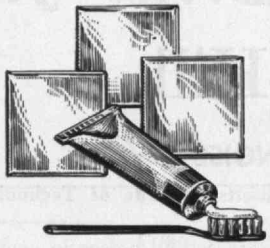
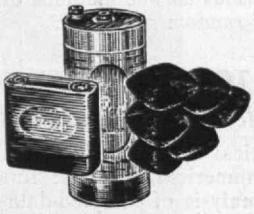


. . . tile or toothpaste

. . . batteries or briquets



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Technology Review

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Volume 62, Number 6 *Edited at the Massachusetts Institute of Technology* *April, 1960*

Feedback

Recommended Reading

FROM W. D. WOLFE, '27:

After several readings of Dr. Wiener's "The Duty of the Intellectual" in the February, 1960, Technology Review, I'm impelled to write some sort of approval of this remarkable article. I think it's tops! It should be made required reading and study for budding intellectuals. Hail to Dr. Wiener's incisive candor!

Cuyahoga Falls, Ohio

A Problem Deflector

FROM B. C. OELHEIM, '46:

I was excited when reading the article on education in the last issue to reach me, and have shown it to our two teachers from England who are teaching about 20 American children in seven of the first eight grades in one room.

We are a group of about 200 Americans situated in a small Spanish community. We are learning to live with our most courteous hosts and for all of us it is a worthwhile experience we shall never forget.

An idea which I pass along to you is suggested by a weather-vane type wind deflector which I have placed on top of our chimney, and which permits us to use our fireplace, today, in a very high wind. (Without the deflector we would have hot ashes blown all over our living room.) I wish that all of us might employ a similar deflector for all of our problems in life and accept each new problem as an incentive to our thinking and as a challenge to our inventive genius. Why can't we use all of our atomic waste material just as fast as it accumulates?

U.S. Naval Activities,
Cartagena, Spain

Helpful to a School

FROM MRS. GUI IGNON:

Today, as in the past, this library would like to express its wholehearted appreciation of your publication. The Technology Review serves as a most valuable and constantly used reference source for the students and faculty, both during the regular academic year, and also during the summer session for advanced science courses.

The Thacher School
Ojai, Ventura County, Calif.

EDITOR: Volta Torrey; BUSINESS MANAGER: R. T. Jope,'28; CIRCULATION MANAGER: D. P. Severance,'38; EDITORIAL ASSOCIATES: J. J. Rowlands, Francis E. Wylie, John I. Mattill; EDITORIAL STAFF: Ruth King, Diana de Filippi; BUSINESS STAFF: Madeline R. McCormick, Louise E. Ryan; PUBLISHER: H. E. Lobdell,'17.

The Technology Review is published monthly from November to July inclusive, on the 27th day of the month preceding the date of issue, by the Alumni Association of M.I.T.; Edward J. Hanley, '24, President; H. E. Lobdell,'17, Executive Vice-president; William W. Garth, Jr.,'36, William L. Taggart, Jr.,'27, Vice-presidents; Donald P. Severance,'38, Secretary-Treasurer.

Editorial and business offices are in Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass. The Review is published at Hildreth Press, Inc., Emmett Street, Bristol, Conn.

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This Month

The Cover

The picture on the cover was provided by the Boston Museum of Fine Arts. How the suspicions that it was a forgery were verified by an electron microbeam probe is related in the article on page 25.

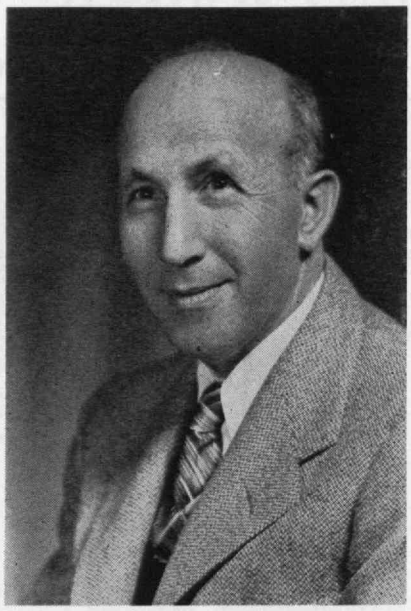
Individuals Noteworthy

7th Webster Professor

ERNST A. GUILLEMIN, '24, was designated this spring to be the seventh Webster Professor of Electrical Engineering at M.I.T.

The Webster Professorship was established by a $400,000 grant to the Institute from the Edwin Sibley Webster Foundation, and was the first endowed chair in the Department of Electrical Engineering. Mr. Webster, '88, was the 16th President of the Alumni Association, and long an active member of the M.I.T. Corporation.

Professor Guillemin came to M.I.T. from the University of Wisconsin, and later received his doctorate from the University of Munich. He was an assistant and instructor in the Electrical Engineering Department before becoming an assistant professor in 1928, an associate professor in 1936, and professor of electrical communications in 1944. He was a general consultant to the Radiation Laboratory from 1940 to 1945. He is a Fellow of the American Institute of Electrical Engineers, and the author of *Introductory Circuit Theory* (John Wiley and Sons, Inc., 1953).



Ernst A. Guillemin, '24

New Posts

NAMED in the news recently were the Alumni whose elections, promotions, and appointments are recorded below:

George W. Ousler, '16, as Assistant to the President, Edwin L. Wiegand Company, Pittsburgh, Pa. . . . *Robert E. Wilson, '16,* as a Member of the United States Atomic Energy Commission . . . *John J. Healy, Jr., '21,* as Vice-president, American Institute of Chemical Engineers;

Howard E. Whitaker, '24, as President, American Paper and Pulp Association . . . *Duncan A. Crawford, '26,* as President, Atlanta Gas Light Company . . . *Elton E. Staples, '26,* as President, Hevi-Duty Electric Company, division of Basic Products Corporation . . . *C. Wesley Meytrott, '27,* as President, the Adelphi Academy of Brooklyn;

By the General Electric Company: *Harland P. Sisk, '27,* as Plant Manager, Holyoke, Mass. . . . *J. Herbert Hollomon, '40,* as Head, General Engineering Laboratory . . . *James E. S. Warden, '40,* as Manager of Operation, West Milton Site Facilities, Knolls Atomic Power Laboratory . . . *Donald D. Scarff, '41,* as General Manager, Large Lamp Department . . . *Bernard F. Cassidy, '52,* as Manager, DIG Power Plant Engineering-Electrical;

Myron T. Smith, '30, as Director of Sales, General Radio Company . . . *Thomas W. Hafer, '35,* and *Edmond P. DiGiannantonio, '40,* respectively, as Manager-Corporate Manufacturing Engineering, and as Marketing Manager, Submarine Signal Operations, Raytheon Company;

Morton M. Jenkins, '35, as Assistant to the Manager of Steel Sales, A. M. Byers Company . . . *William J. Suchors, '35,* as Coordinating Director, Engineering and Product Planning, Remington Rand Univac Division, Sperry Rand Corporation . . . *William M. Creasy, '36,* as Manager, the New York Division, The Lummus Company;

James McCormack, '37, as a Director, Bulova Watch Company, Inc. . . . *Robert R. Wagstaff, '37,* as Engineering Vice-president and Director, United Engineers & Constructors, Inc., Philadelphia . . . *August B. Hunicke, '39,* as Director of Engineering, Cramer Controls Corporation . . . *Harlow J. Reed, '39,* as Vice-president for Engineering, Olin Mathieson Chemical Corporation;

Richard L. Pope, '40, John G. Holmes, '47, and *William W. Heilman, '51,* respectively, as Manager, Marketing Research Division, as Manager, Central Sales Region, and as Plant Manager, Niagara Plant, Union Carbide Metals Company;

Herman A. Affel, Jr., '41, as General Manager, Computer Division, Philco Corporation . . . *Robert T. Luedeman, '41,* as Chief Engineer, Materials, Weston Instruments Division, Daystrom, Inc. . . . *James D. McNitt, '41,* as Executive Vice-president, Bristol Laboratories;

Charles A. Hathaway, '43, as Assistant General Manager, Air Impeller Division, Torrington Manufacturing Company . . . *John M. Waters, '44,* as Director of Administrative Services, Plax Corporation, Hartford, Conn. . . . *David W. Brown, '48,* as Manager of European Operations, Blackhawk, S.A.;

George F. Clifford, '48, as Manager, Spinco Division, Beckman Instruments, Inc., Palo Alto, Calif. . . . *Sidney Lees, '48,* as President and Technical Director, Instrument Research, Inc., Washington, D.C. . . . *Harold G. Ingraham, Jr., '49,* as Assistant Actuary, Ordinary, Massachusetts Mutual Life Insurance Company;

Robert M. White, '49, as Associate Director of Research, The Travelers Weather Research Center, Hartford . . . *Daniel L. McGuinness, Jr., '50,* as Vice-president, Proportioneers, Inc., division of B-I-F Industries, Inc., Providence, R.I. . . . *Ralph L. Quinlan, '50,* as Development Manager, Goodyear Tire & Rubber Company, Windsor, Vt.;

Kenneth W. Gardiner, '53, as Chief Research Chemist, Consolidated Electrodynamics Corporation, subsidiary of Bell & Howell Company . . . *Richard J. Wengraf, '53,* as Resident City Planner, New Bedford, Mass.

(Continued on page 6)

. . . a hand in things to come

Creating a strange world of cold

The coldest natural temperature ever recorded—100 degrees below zero—occurred in the Antarctic. But the people of Union Carbide are producing temperatures all the way down to minus 450 degrees . . . approaching absolute zero!

Startling things are being done at this unearthly cold temperature. Many types of living tissue are being preserved, and research is now well under way in freezing whole blood. Certain metals become perfect conductors of electricity—a rare quality which may bring greater efficiency to electronic equipment. And, for over fifty years, Union Carbide has used these ultra-low temperatures to turn air into liquid . . . then extract oxygen, argon, nitrogen and other atmospheric gases in their pure form. They are produced on a mammoth scale to meet the great demand from industry.

Working with such extreme cold is still a young science known as cryogenics. It is only one of many areas in which the people of Union Carbide are striving to make tomorrow a better world.

Learn about the exciting work going on now in gases, carbons, chemicals, metals, plastics, and nuclear energy. Write for "Products and Processes" Booklet K, Union Carbide Corporation, 30 East 42nd St., New York 17, N.Y. In Canada, Union Carbide Canada Limited, Toronto.

UNION CARBIDE

. . . a hand in things to come

Individuals Noteworthy

(*Continued from page 4*)

Management Academy

PROFESSOR Emeritus Erwin H. Schell, '12, of the M.I.T. School of Industrial Management, was a delegate to the International Academy of Management's meeting in Australia, which was addressed by James R. Killian, Jr., '26, Chairman of the M.I.T. Corporation. Fifteen hundred representatives of 29 nations were expected to attend this 12th meeting of the *Comité International de l'Organisation Scientifique,* known as CIOS.

Professor Schell is chancellor of the International Academy of Management, an honorary society formed in 1957, and was to participate in ceremonies honoring international managers. The Academy recognizes contributions to management through work, vision, values, and beliefs in a free society by selecting 10 Fellows each year. He also was invited to speak at the University of Melbourne.

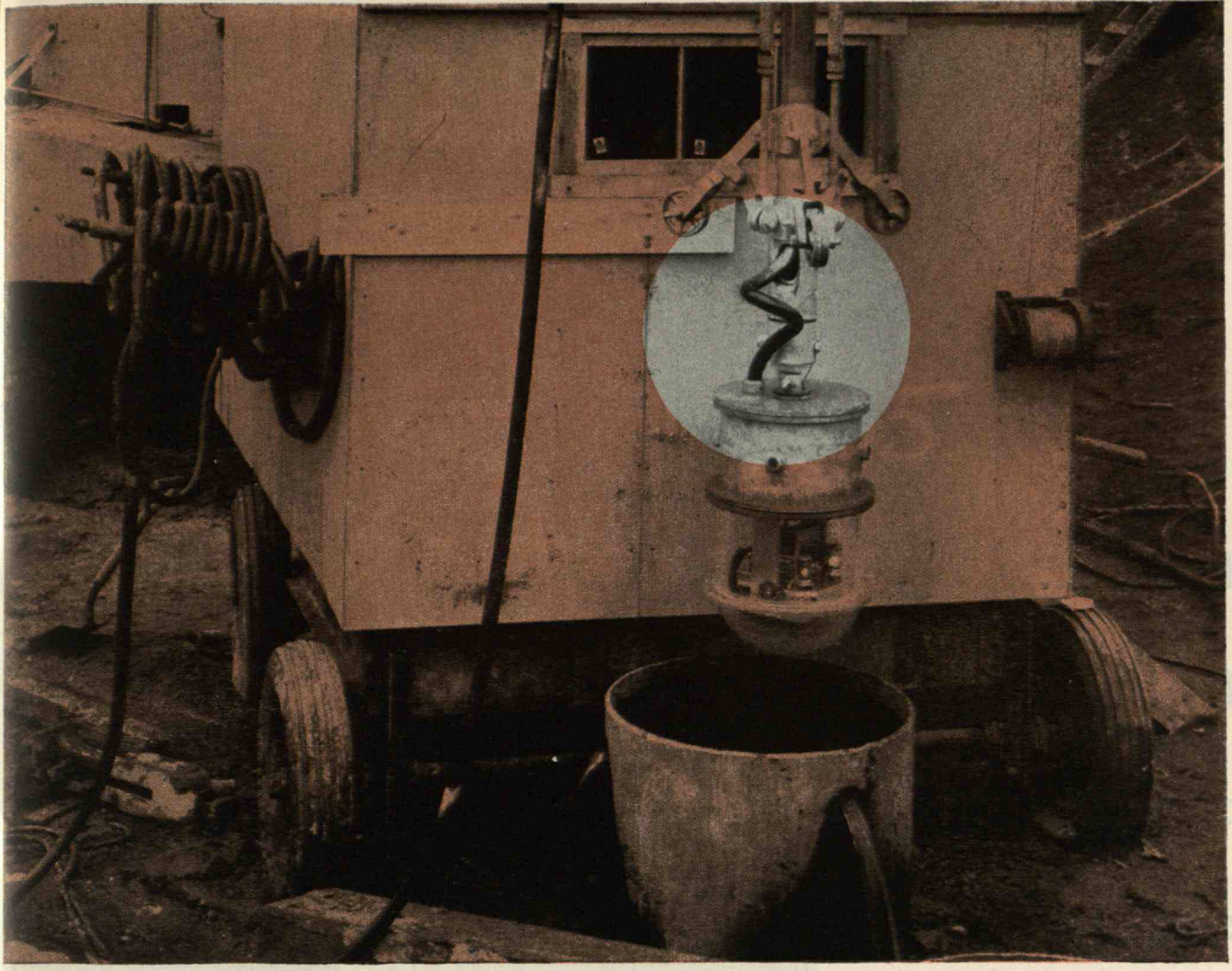
Librarian Emeritus

ALTHOUGH Miss Marguerite Chamberlain's retirement is reported in the M.I.T. librarian's annual report, she is still working at the Institute part time, and concerning herself especially with the enlargement of the mathematics collection.

Miss Chamberlain came to M.I.T. to organize the science library in March, 1932. She says now that she has organized it she spends her time "trying to keep up with it." In the early days, she recalls, the Institute was small enough so that a librarian knew everyone who patronized the library and what he did. In May, 1952, Miss Chamberlain, along with the science library, moved from the Eastman Library in Building 6 to the new Hayden building. "There's much more movement and bustling about here," she says. "In fact it's a bit like doing business on Main Street."

After graduating from Colby College in Maine with a B.A. degree, Miss Chamberlain taught for three years before continuing her studies at Simmons, held various library posts, and finally came to M.I.T.

(*Continued on page 12*)



OPTIC NERVE FOR EYES THAT SEE 100 FEET BELOW THE SURFACE

This is a television camera. Its job is to photograph the substrata of excavations, thereby providing information needed by engineers in planning the construction of Boston's new Prudential Center, a modern, multi-million dollar real estate development.

Here in the Back Bay section of Boston, with its artificially maintained water table, this sealed camera must go down into a water-filled hole 100 feet below the surface. To transmit the picture from the camera to the surface monitor, Lake Service Corp. of Brighton, Massachusetts, designers and manufacturers of the television equipment, chose Simplex Anhydrex XX insulated cable because of its ability to withstand the rigors of submarine and direct burial duty.

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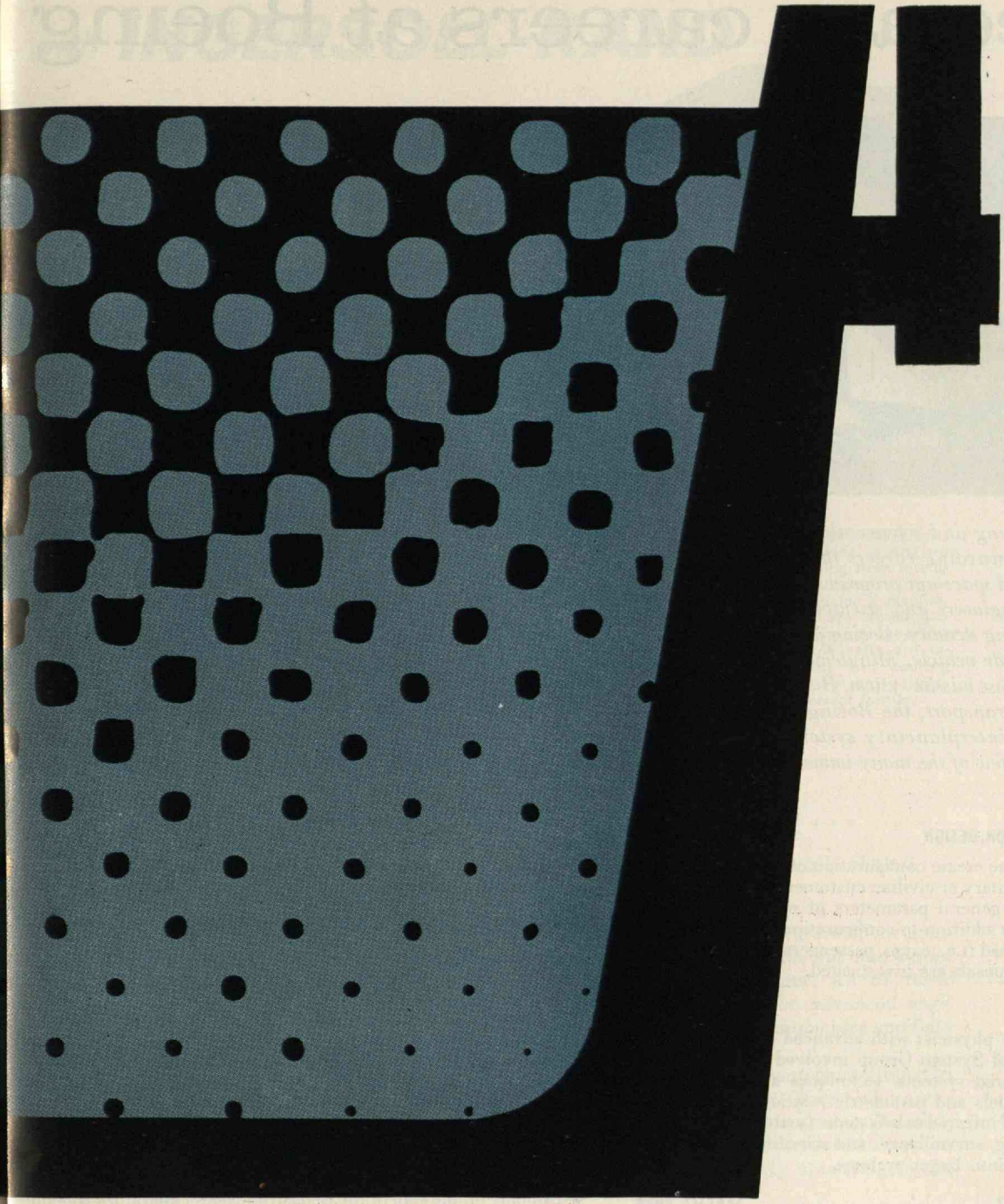

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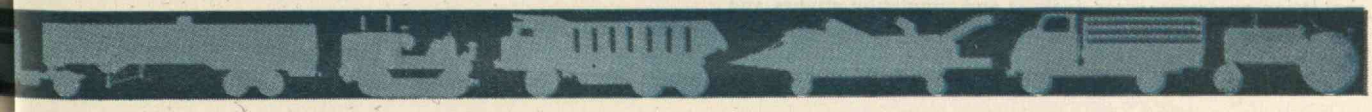
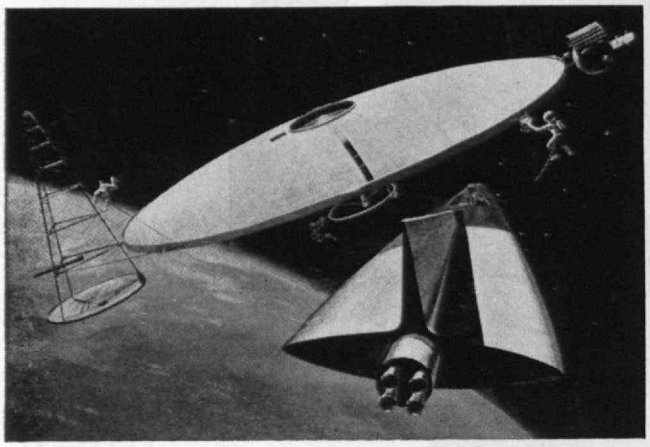


Space-age careers at Boeing



This year, engineering and science alumni will find more challenging and rewarding careers than ever at Boeing. Advanced missile and space-age programs are expanding, and the proportion of engineers and scientists to Boeing's total employment is growing steadily. Boeing programs include the Dyna-Soar boost-glide vehicle, Minuteman solid-propellant ICBM, BOMARC *defense missile system, B-52G missile bomber, KC-135 jet tanker-transport, the Boeing 707 jetliner, and lunar, orbital and interplanetary systems and advanced research projects. A few of the many immediate openings are listed below:*

ADVANCED CONFIGURATION DESIGN — **WICHITA AREA**

M.S. or Ph.D. in A.E. to create configuration of new vehicles proposed by potential military or civilian customers. Creative design of vehicles based on general parameters of missions (payload, performance, etc.). In addition to configuration, special features such as handling payload (i.e., cargo, passengers) and comparison with competitors' proposals are investigated.

INFRARED — **SEATTLE AREA**

Electrical engineer or physicist with advanced degree to set-up and direct an Infrared System Group involved in: (1) Studies and analyses of infrared systems, techniques and phenomena, (2) Definition of models and parametric relationships, and (3) Synthesis of advanced infrared sub-systems (search, track, terminal guidance, mapping, surveillance, and scientific instrumentation) for integration into larger systems.

ELECTRONICS-RELIABILITY — **SEATTLE AREA**

Electrical engineer with B.S. degree minimum (graduate work or equivalent experience desired) to organize and manage reliability programs; to establish requirements, evaluate reliability data and initiate corrective action for missile components and tactical test equipment.

ELECTRONICS-DIGITAL COMPUTER — **SEATTLE AREA**

Engineers with advanced E.E. degree or particularly applicable experience to design and integrate digital computers in advanced military and space programs, involving internal logic design of the computers and the external organization of the associated equipment used in the guidance and control system.

ENGINEERING ANALYSIS & PROGRAMMING — **SEATTLE**

Mathematicians or engineers with B.S. to Ph.D. degrees to work in engineering computing and analysis areas. Analysis positions involve correlation and conversion matrix studies, trajectory simulation programs, error analysis and simulation studies and many others. Computing positions involve programming a wide variety of complex engineering problems to be solved with high-speed electronic data processing machines—digital and analog.

PLASMA PHYSICS — **SEATTLE AREA**

Experimental physicist with Ph.D. in physics for the staff of the Plasma Physics Laboratory, Boeing Scientific Research Laboratories, to conduct studies in the field of Basic Experimental Micro Wave Plasma Physics, Basic Transport Properties of Plasmas and in Theoretical and Experimental Quantum Plasma Physics.

OPERATIONS & WEAPONS SYSTEMS ANALYSIS — **WICHITA**

M.S. or Ph.D. in math, physics, electrical or aeronautical engineering to obtain data on the anticipated operational environment of the devices under study by Advanced Design Staff. Devise analytical models of procedures describing operation of the devices in order to estimate the operational utility of same under study. Studies compare Advanced Design products with other companies and demonstrate anticipated utility to the customer.

ELECTRONICS-TELEMETRY — **SEATTLE AREA**

B.S.E.E. with good knowledge of telemetry systems, transducers, and systems providing inputs into telemetry systems, to work on telemetry systems integration. This requires ability to represent the company in meetings with the customers and associate contractors.

ELECTRO-MAGNETICS — **SEATTLE AREA**

Ph.D. in electrical engineering or physics to direct and participate in the work of a research group engaged in the theoretical and experimental investigation of the propagation and reflection of electro-magnetic waves in the presence of a plasma.

WELDING ENGINEERING — **SEATTLE AREA**

Engineers with degree in Met.E., Mech.E., E.E. or equivalent, to maintain weld equipment, design tools, develop techniques and direct proper use of this equipment, and establish processes for all types of welds used in the unit, including weld settings for qualification programs.

PERFORMANCE & STABILITY & CONTROL ANALYSIS — **SEATTLE AREA**

Aeronautical engineers at B.S. and M.S. level to conduct performance analysis and stability and control analysis. Each field is intimately associated with flight testing and wind tunnel testing. Performance assignments include preparation of sales presentations, operating instructions and preliminary design work in connection with new aircraft; stability and control assignments cover wing and tail design as well as studies concerning detailed control systems.

GEOASTROPHYSICS — **SEATTLE AREA**

Theoretical physicists or astronomers with Ph.D. in physics or astronomy on the staff of the Geoastrophysics Laboratory, Boeing Scientific Research Laboratories, to carry out theoretical research studies in the field of Geoastrophysics, particularly in connection with the phenomenology and physics of the planetary system. Excellent support is available for research in Solar Physics, Solar Terrestrial relationships and Upper Atmosphere Physics.

Advantages you'll enjoy at Boeing include up-to-the-minute facilities, unexcelled research equipment, insurance and retirement programs, and a company-paid graduate study program (M.A. and Ph.D.) designed to help you get ahead faster.

For further information write: Mr. Stanley M. Little, Boeing Airplane Co., P. O. Box 3822 - UMT, Seattle 24, Wash.

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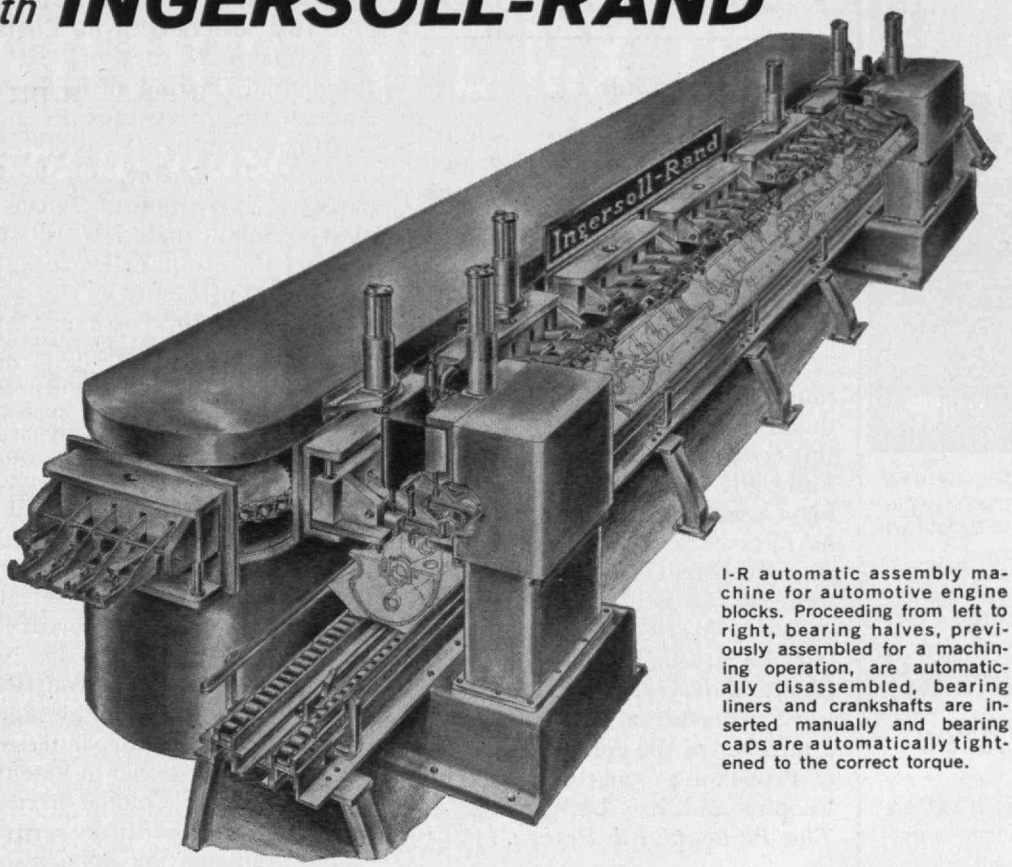
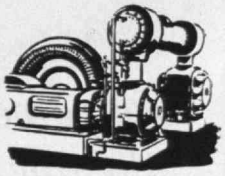
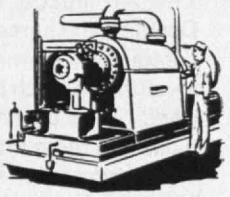


I-R automatic assembly machine for automotive engine blocks. Proceeding from left to right, bearing halves, previously assembled for a machining operation, are automatically disassembled, bearing liners and crankshafts are inserted manually and bearing caps are automatically tightened to the correct torque.

also means **LEADERSHIP** in



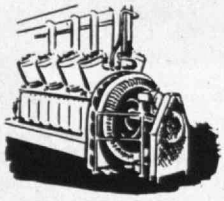
Compressors and Blowers



Centrifugal Pumps

Rock Drills

Steam Condensers



Diesel & Gas Engines

If you are interested in automation . . .

Here's what Air-Tool Engineering at Ingersoll-Rand can mean to you

AUTOMATION, today, is the magic word that is opening new horizons for cost-saving economy in practically every industry. Things that used to be done by hand are now being done automatically. Here is a rapidly growing field which offers fine opportunities for you as a mechanically minded engineer.

Many interesting engineering problems arise in the design, development and experimental work on such machinery, and creative engineering is necessary to solve them. Practical engineering ability is also needed for installation and initial operation of such equipment. The early studies of customers' needs and automation equipment sales are also challenging jobs.

Ingersoll-Rand is a recognized leader in designing and building these labor-saving air and electric tools, and is also one of the country's leading manufacturers of air compressors, pumps, rock drills, gas and diesel engines, vacuum equipment. All of these products depend heavily on advanced engineering in their design, manufacture and field application.

Then there are the advantages of living in Athens, Pa., where Ingersoll-Rand builds automation equipment. The picturesque Pennsylvania hills provide many recreational advantages that are particularly appealing to the outdoor man.

If you are looking for a leadership career with long-range job security and excellent opportunities for advancement, you'll find it at Ingersoll-Rand.

For further details, contact your Placement Office, or write to Ingersoll-Rand, 11 Broadway, New York 4.

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Among the many graduates of Massachusetts Institute of Technology at Ingersoll-Rand are:
L. C. Hopton, 1926, *President;* J. Bentley, 1925, *Vice-President.*

Individuals Noteworthy

(Continued from page 6)

New Philosopher

JOHN RAWLS, whose special field is moral and political philosophy, has been appointed professor of humanities at M.I.T., effective next July 1.

Born in Baltimore in 1921, Dr. Rawls received both his undergraduate and graduate education at Princeton University, and became an instructor in philosophy there. In addition to several fellowships, he received a post-doctoral Fulbright research grant in 1952 for a year at Oxford, and in 1956 he received a research grant from the Rockefeller Foundation. He went to Cornell as an assistant professor in 1953 and three years later he was made an associate professor. This year he has been on leave to lecture at Harvard. He is a member of the Advisory Council of Princeton's Department of Philosophy and has been editor of *The Philosophical Review.*

Honors

MEDALISTS and recent recipients of other distinctions include:

Milton Kahn, '12, establishment of the Milton Kahn Chair in Community Organization, by Brandeis University . . . *Albert Haertlein, '18,* the Award of Merit, by the Engineering Societies of New England . . . *Edwin T. Steffian, '21,* the Residential Citation, of its Seventh Annual Design Awards Program, by *Progressive Architecture;*

Stanley D. Stookey, '40, the first patent for invention of Pyroceram glass-ceramic materials . . . *Lt. Colonel Woodruff T. Sullivan, '40,* the Legion of Merit, by the Secretary of the Air Force . . . *Lt. Colonel Nils M. Bengtson, '48,* the Commendation Ribbon, U.S. Army.

Honored by Newcomen

A BOOK of more than 65 patents bearing the name of David A. Meeker, '24, President of the Hobart Manufacturing Company, was presented to Mr. Meeker at a dinner in Dayton on February 10, given in his honor by the Newcomen Society in North America.

At the same time, Mr. Meeker received a congratulatory letter from the U.S. Commissioner of Patents — and the title of Colonel from the Governor of Kentucky. M.I.T. Alumni among the 450 business and industrial leaders present included Abbott L. Johnson, 2d, '22, Joseph C. Patty, '22, Edward S. Johnston, '25, and Guy S. Frisbie, '26.

Alumni Committees

AT ITS February meeting, the Alumni Council elected D. Reid Weedon, Jr., '41, as chairman of the Association's Committee on M.I.T.'s Centennial. Other new committees include:

Future Subsidies for Alumni Day and Reunions — Hugh S. Ferguson, '23, chairman; Ralph H. Davis, '31, F. Leroy Foster, '25, and Philip A. Stoddard, '40.

Continuing Education for Alumni — Carroll L. Wilson, '32, chairman; James M. Austin, '41, Charles C. Bell, '33, Donald A. Hurter, '46, Douglas M. McGregor, Ascher H. Shapiro, '38, Thomas K. Sherwood, '24, Samuel R. Spiker, '25, and Theos J. Thompson.

Local Clubs and Activities — Clarence R. Westaway, '33, chairman; William S. Edgerly, '49, George H. R. McQueen, '49, Louis Rosenblum, '42, Elwood W. Schafer, '32, Paul P. Shepherd, '53, and John T. Weaver, '50.

(Concluded on page 50)

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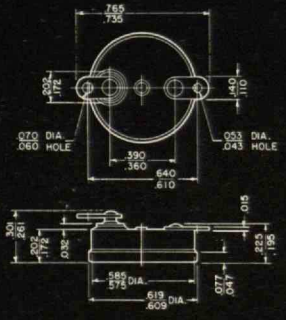

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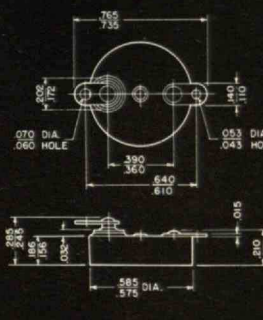

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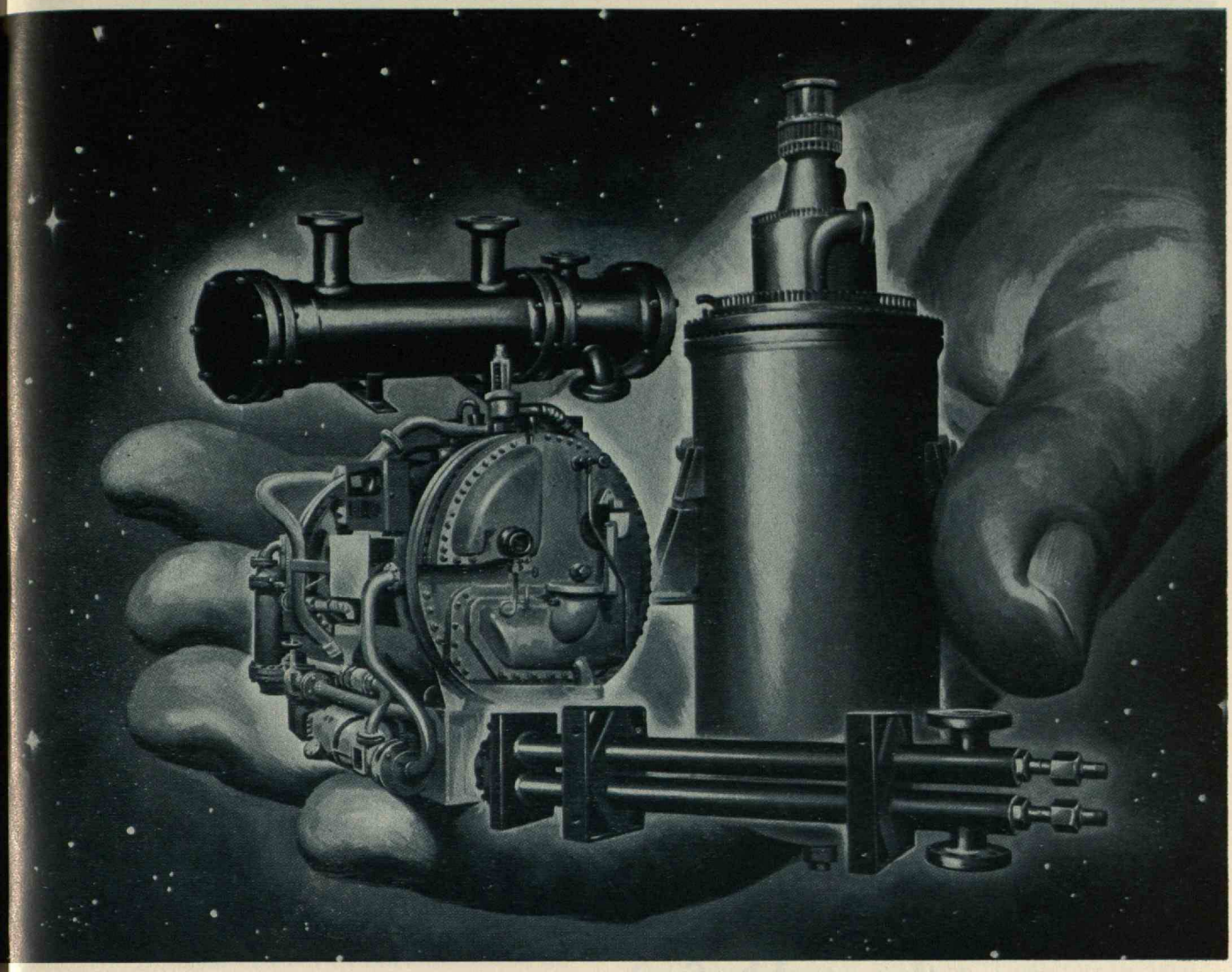

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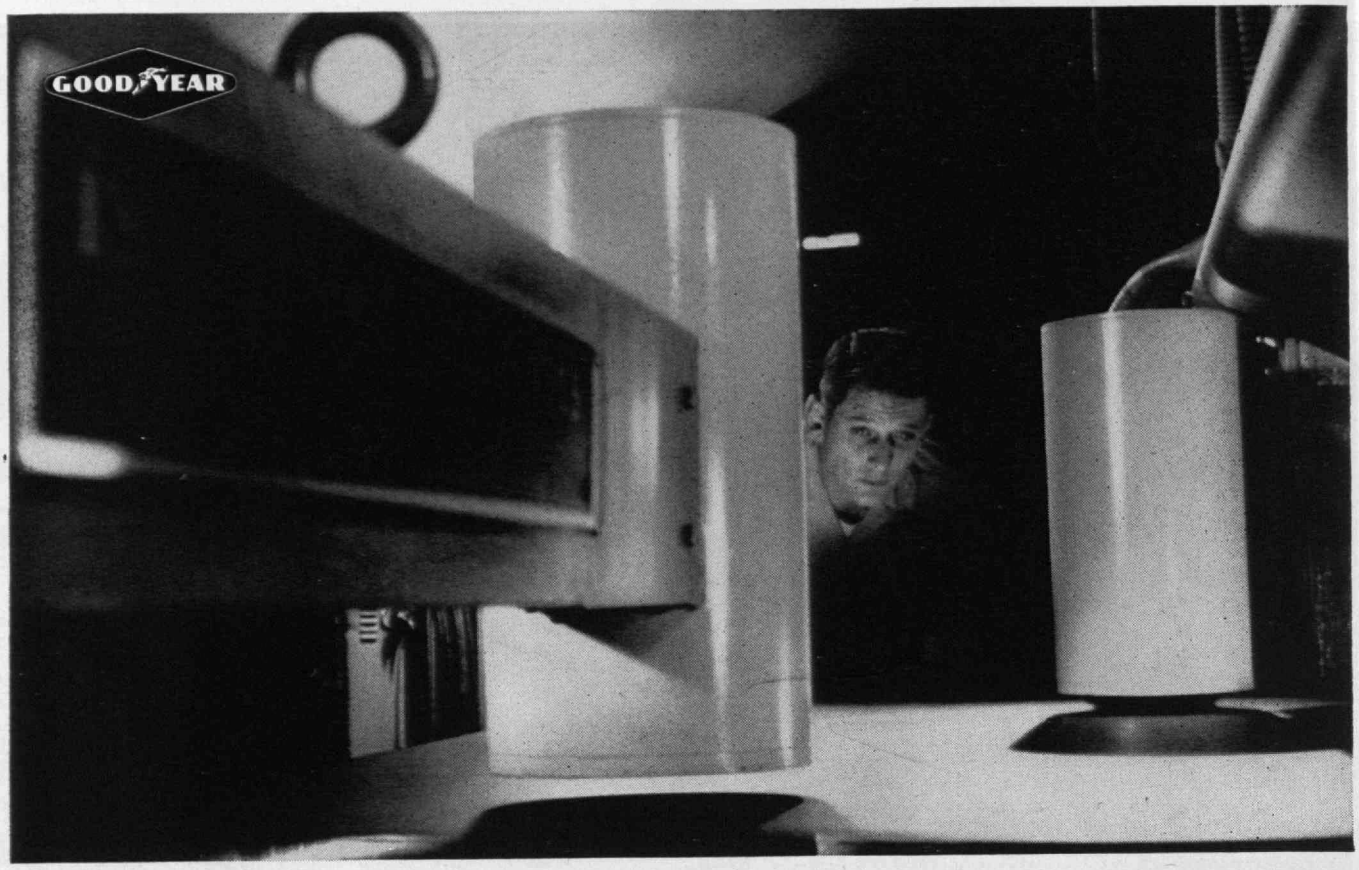

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Trend Of Affairs

Four Compton Lectures On Biological Order

A SERIES of Karl Taylor Compton lectures will be given at M.I.T. this spring by André Lwoff, Head of the Department of Microbial-physiology at the Pasteur Institute in Paris. Dr. Lwoff has long been a leader among scientists interested in the unity of biochemical phenomena, and "Biological Order" will be the theme of his four lectures here in April.

Born in France in 1902 and educated at the University of Paris, he has been associated with the Pasteur Institute for nearly 40 years. After becoming an authority on protozoa, he turned to microbial nutrition and bacterial physiology; more recently he has been studying viruses in tissue cultures of vertebrate cells and the problems of genetic control.

In his own words: "Dr. Lwoff has worked here and there on this and that . . . has been a fellow of the Rockefeller Foundation at Heidelberg and at Cambridge and Dunham Lecturer at Harvard . . . has discovered some strange creatures and unexpected phenomena which have been published in 250 papers dealing with various aspects of microbiology . . . (and) as a result of that and this, is now a member of various scientific societies, here and there."

These societies include the National Academy of Sciences in this country, the New York Academy of Sciences, the Botanical Society of America, the American Academy of Arts and Sciences, the Harvey Society, and the Royal Society of London. He has visited this and other English-speaking countries frequently, and last year received honorary degrees from both the University of Oxford and the University of Chicago.

"In his lectures," an acquaintance reports, "he naturally tends to put philosophical constructions into what others would leave as uninterrupted data. He has a whimsical humor which delights audiences and enlivens otherwise technically difficult discussions."

At the Institute he will discuss:

On April 6 – "The Living System: Biological Order and Entropy."

On April 12 – "Hereditary Order: Specificity, Genetic Information, and Nucleic Acids."

On April 14–"Functional Order: Control and Regulation of Biosyntheses."

On April 20 – "Disorder: Viruses and Viral Functions."

Each lecture will be at 8 P.M. in Kresge Auditorium.

On April 15, at 4 P.M., Professor Cyrus Levinthal of M.I.T. will be chairman of a seminar on "Topology and Topography of the Gene," at which Dr. Lwoff and Professor Seymour Benzer of Purdue University will speak; and on April 22, at 4 P.M., Dr. Salvador E. Luria of M.I.T. will preside at a seminar on "Viruses and Cellular Control Mechanisms," in which Dr. Lwoff will be joined by Professor Renato Dulbecco of the California Institute of Technology.

Pioneering in Aviation

IN 1912 Igor I. Sikorsky built a four-place biplane with a wood veneer fuselage and won a prize of 30,000 rubles from the Russian government. A year later his four-engine biplane, which had such unusual features as upholstered chairs and a lavatory, set a world's record by carrying 54 people; the Czar inspected it, but did not take a ride.

These were some of the early exploits of the aeronautical engineer who will deliver the second Lester D. Gardner lecture at M.I.T. on "Pioneering in Aviation." The lecture, at 3:30 P.M. on Thursday, April 14, in the Kresge Little Theater, will be open to the public.

Mr. Sikorsky founded a company in 1923 to build flying boats and helicopters in this country. His honors include the Potts Medal of the Franklin Institute, the Sylvanus Reed Award, the Guggenheim Medal, the Collier Trophy, and the James Watt International Medal; France recently made him a Chevalier of the Legion of Honor.

The Gardner lectures result from a bequest of the late Major Lester D. Gardner, '98, who for many years was publisher of *Aviation* and *Aeronautical Engineering* magazines.

International Week

FOREIGN students at the Institute gave a series of programs in March to express their appreciation to America. In addition to a discussion of "Underdeveloped Countries – A Threat to World Peace" the events scheduled included film showings, a performance of native African dances, and demonstrations of cricket, judo and jujitsu, and "Kabaddi," a ball game played in India that is rarely seen in the United States. The chairman of the committee in charge was Jaime H. de Sola, '60, who is from Curacao.

Class Reunions in 1960

1905 June 10–12. Cape Cod. William G. Ball, Reunion Chairman, Box 285, Cotuit, Mass.

1907 June 8–10. Oyster Harbors Club, Osterville, Mass. Philip B. Walker, Secretary, 18 Summit Street, Whitinsville.

1908 June 10–12. Melrose Inn, Harwich Port, Mass. H. Leston Carter, Secretary, 14 Roslyn Road, Waban 68.

1910 June 10–12. *50th reunion:* Charterhouse Motor Hotel, Waltham, Mass. John B. Babcock, Reunion Chairman, Box 1981, Portland, Maine.

1915 June 10–12. Snow Inn, Harwich Port, Mass. Reunion Chairmen: Azel W. Mack, Apt. 26A, 100 Memorial Drive, Cambridge 42; George T. Rooney, 10 Sharpe Road, Belmont 78.

1920 June 10–12. Chatham Bars Inn, Chatham, Mass. Malcolm S. Burroughs, Reunion Chairman, The Dexter Company, 219 East 44th Street, New York 17, N.Y.

1925 June 10–12. Chatham Bars Inn, Chatham, Mass. Reunion Chairmen: David Goldman, 59 Littlefield Road, Newton 59; Edwin E. Kussmaul, 74 Highview Street, Westwood.

1930 June 10–12. Oyster Harbors Club, Osterville, Mass. Reunion Chairmen: Edwin M. Kingsley, 14 Upwey Road, Wellesley Hills 82; George W. Gassett, 31 Liberty Pole Road, Hingham.

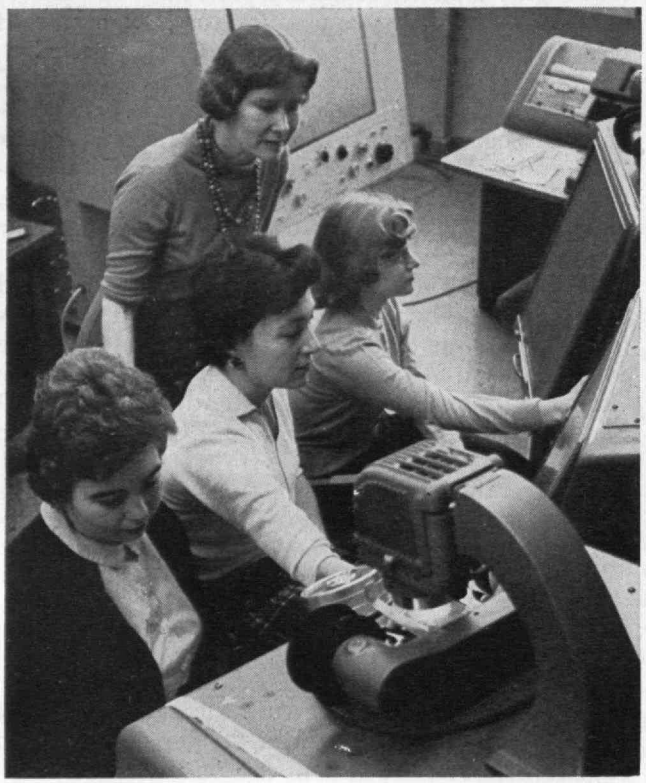
1935 June 10–12. *25th reunion:* Baker House, M.I.T., Cambridge 39. Professor Walter H. Stockmayer, Reunion Chairman, Room 6-229, M.I.T., Cambridge 39.

1940 June 10–12. Chatham Bars Inn, Chatham, Mass. Robert A. Bittenbender, Reunion Chairman, 85 Meriam Street, Lexington.

1945 June 10–12. Snow Inn, Harwich Port, Mass. Reunion Chairmen: William J. McKay, 6 Robert Road, Framingham; Gerald V. Quinnan, 210 May Street, Needham.

1950 June 10–12. The Curtis Hotel, Lenox, Mass. Reunion Chairmen: Frank E. Parisi, 53 East Quinobequin Road, Waban 68; Charles Levy, 61 Central Street, Auburndale 66.

1955 June 11–12. *5th reunion.* Woodbound Inn, Rindge, N.H. Reunion Chairmen: Lennard Wharton, 19 Shepard Street, Cambridge 38; James H. Eacker, Eliot Street, Sherborn, Mass.



THESE SIX LADIES spend 45 minutes of every working hour in a darkened room "reading" photographs showing tracks of atomic particles for the M.I.T. Laboratory for Nuclear Science. Last year they examined 100,000 pictures for the physicists. Head of the group (*standing in picture above*) is Mrs. Marianne Von Randow from Germany. She studied mathematics at the University of Hamburg and is the only one with scientific training. From left to right (in picture with Mrs. Von Randow) are Ragnhild Reinert from Norway, Mrs. Guela Pariser from Israel, and Grace Dutot from Tamaqua, Pa.; in the other photo are Andree Pellegrin from France and Mrs. Ameriga Milano from Rome.

Telephoning Via a Balloon

Time exposure made at Round Hill shows bright balloon trail and (right) the trace from rocket burnout. Clouds and timing marker caused breaks in line.

ON FEBRUARY 27, a bright new "star" shown briefly in the early evening sky, visible for hundreds of miles up and down the Atlantic Coast. This transient celestial visitor was a 100-foot aluminized balloon, rocket-launched from Wallops Island, Va., by the National Aeronautics and Space Administration. The rocket hurled the balloon, folded into a 26-inch container, into a sub-orbital trajectory up to an altitude of about 100 nautical miles, where it inflated and continued upward, to a maximum height of some 200 miles before falling back to earth.

Its brilliant glow in the rays of the sun from beyond the western horizon, outshining all normal residents of the heavens, heralded a new step forward in radio communications, for this was the first time on record that a man's voice was reflected back to earth from an artificial neighbor of terrestrial origin. FM radio voice messages reflected from the balloon were fully received at M.I.T.'s Round Hill field station in South Dartmouth, Mass., by members of Lincoln Laboratory's Radio Propagation Group co-operating with Bell Telephone Laboratories, which is under contract with NASA.

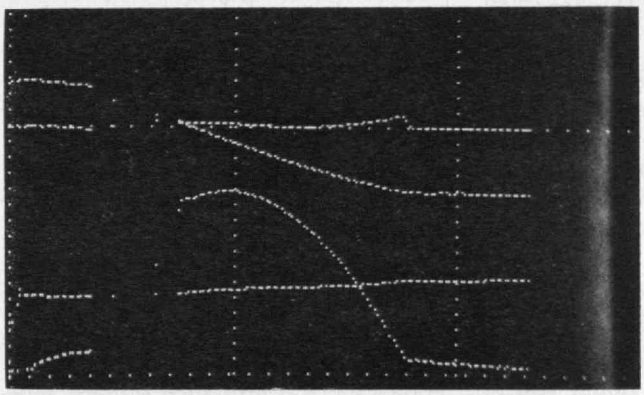
Tracking the balloon with radars at 425 and 675 megacycles per second, not to mention a photo-theodite and an optical tracker, the Lincoln team pointed a parabolic receiving antenna at the target and recorded a voice message from Holmdel, N.J., about 300 air-line miles away. The radio wave path length in this test varied between 500 and 1000 miles.

Between transmissions of the voice message, two corner antennas mounted on the 28-foot dish were used to measure signal fading (which might tell how well the balloon had inflated). In a similar experiment on January 16, a radio carrier signal was bounced from Holmdel to Round Hill but voice modulation was not attempted.

Lincoln's Air Force-sponsored radar on Millstone Hill tracked the launching rocket and the balloon as it passed through apogee and came back to earth in February. The Millstone data, transmitted to NASA for evaluation, showed that the balloon slowed abruptly in its descent at an altitude of about 40 nautical miles, and dropped much slower from there on.

This successful experiment was another step by the NASA-directed team toward long-range, wide-band radio relay communication by means of passive satellites, which do not need electronics or power of their own, but are large enough to reflect back to earth a radio signal of useful magnitude.

Called Project Echo, the aim of this research project is to use balloon satellites in high orbits, apparently almost stationary in the sky, as targets for long-range radio relay.



This computer display shows averaged radar data at Millstone Hill on balloon. Horizontal time scale covers about 15 minutes. Curves at left apply to rocket; at right, to balloon. Four from top to bottom at left show azimuth angle, Doppler (radial velocity), range and elevation angle.

New Trends in Teaching

INNOVATIONS in education were described to the M.I.T. Alumni Council on February 29 by both Arthur R. von Hippel, Professor of Electrophysics, and Roy Lamson, Professor of Literature. William L. Taggart, Jr., '27, Vice-president of the Alumni Association, presided at this meeting and 179 members and guests attended.

Professor von Hippel spoke wittily of the need for interdepartmental centers, to encourage engineers to look behind the curtains of standards and handbooks, and prevent academic disciplines from becoming a Tower of Babel. He also dwelt on the importance of refresher courses, and called for both industrial and governmental support of fresh approaches to technological research and education.

Professor Lamson enthusiastically reported progress at the Institute in breaking down the barriers between professional and cultural education. He declared the standards of the new Course XXI match those of other courses and its graduates find themselves well equipped for advanced work in many different disciplines.

Finer Ball Bearings

A SIGNIFICANT technical advance in ball bearings has been made in the last five years at the initiative of the M.I.T. Instrumentation Laboratory. Ball bearings with tolerances of 20 millionths of an inch have been developed. This is 10 times better than standard requirements, and important in the nation's missile program.

A human hair is about 3,000 millionths of an inch thick. Bearings frequently are measured to tolerances from 10 to 20 times smaller, but the tolerances of these bearings is 150 times smaller than the thickness of a hair.

These ultra-precise bearings are used in the gyroscopes that go into inertial guidance systems. Gyros are the hearts of such systems. Their spinning is essential to keeping a vehicle on a particular course, and to obtain near perfect performance from the gyros the ball bearings that carry the spinning wheels must surpass the customary commercial standards.

"The development of super-accurate bearings is an example of the 'leap-frog' technique in the science and technology of inertial guidance," says William G. Denhard, '42, who is in charge of the Instrumentation Laboratory's inertial gyro group. "Ten years ago, in the relatively early days of work on inertial guidance, ball bearings that were used were more accurate in their geometry than other parts of the instruments that went into the guidance system. With the passage of time, there was a concerted effort to improve the machining and inspection of other parts, so that by 1955 these other parts had been improved to a degree that made them dimensionally superior to the bearings in terms of our needs."

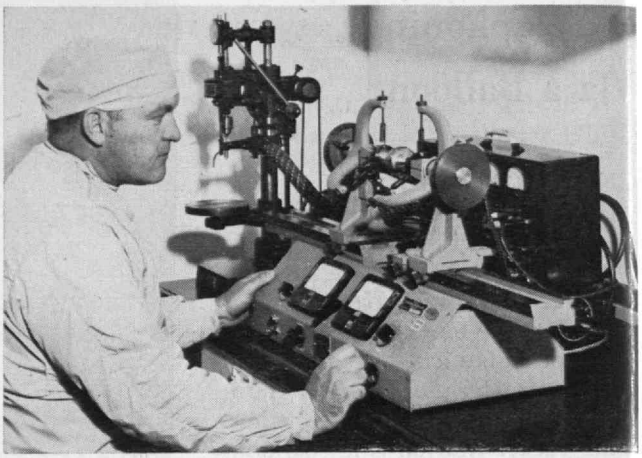
Work with bearings now has improved them to a point that has resulted in a good balance in dimensional control. Today inertial guidance systems have better accuracy and reliability than was expected only a few years ago. While there will be more advances in bearing geometry, nothing approaching the recently achieved improvement is expected very soon; further improvements are likely to be in materials, design, and operational testing.

A team effort involving M.I.T., the Barden Corporation of Danbury, Conn., and the Ballistic Missile and the Wright Air Development Divisions of the Air Force's Air Research and Development Command in Dayton, Ohio, brought about the desired improvement in tolerances.

Tooling and measuring techniques that could assure such tolerances were limited as recently as the mid-1950's, and more adequate inspection methods had to be achieved before more precise ball bearings were produced. Air gauging devices, which measure dimensions by the amount of air escaping between a tube containing small bleeder holes and the piece being inspected, were in use; and linear transformer transducers, which indicate measurements by electronic methods, were coming into broader use. More adequate adaptations of these two types of gauging, and automatic gauging techniques, were needed.

In addition to developing measuring devices, the team developed model shop machine-tool techniques for increasing the percentage of highly accurate bearings; tooling methods and machine tools were modified in a long, painstaking process that required hand-crafting throughout. Now consistent dimensions have been attained, and inertial guidance is moving from an "industrial craftsman" production method to a "mass production" method while retaining the required standards of performance and control.

Although the need for such bearings has increased, the Barden Company still finds that such fine tolerances are needed in only a small fraction of 1 per cent of its total production.



Technician Ralph C. Brown of the M.I.T. Instrumentation Laboratory uses a balancer to eliminate dynamic unbalances in inertial guidance wheel and bearing assembly.

Women at the Barden Corporation's plant in Danbury, Conn., clean individual ball bearings in a super-clean area. Vibration testers are in foreground; spray booths in rear.

We're Older Than We Thought

FROM MIDNIGHT ON, night after night two years ago, Professor Fred Hoyle of Cambridge University toiled alone in the M.I.T. Computation Center. He was using its IBM 704 computer to trace the evolutionary development of stars. He has made more computations since then with other big machines, and these have led him to revise his opinion of the age of the galaxy which includes our little solar system. In 1955, from less complete calculations, he estimated our Milky Way's age at 6.2 billion years. Now he believes it is at least 10 billion years old.

Civil Engineering's Computer Laboratory

ESTABLISHMENT of a computer laboratory for M.I.T. civil engineering students, the first of its type in the nation, was announced this term by John B. Wilbur, '26, Head of the Department of Civil and Sanitary Engineering. Charles L. Miller, '51, Associate Professor of Surveying, will be its director and Robert A. Laflamme, '57, an instructor in civil engineering, will be responsible for technical supervision.

For this laboratory an IBM 650 has been installed in the basement of the main M.I.T. building. More than 1,500 IBM 650's are currently in use, and they have become known as the "workhorses" of data-processing machines. Fifty colleges and universities now are using the 650's for teaching and nonsponsored research under an IBM educational program.

Installation of the civil engineering computer brings to 10 the number of large data-processing devices now used on the M.I.T. campus. They include an IBM 704 high-speed computer at the Computation Center; another IBM 650 in the Instrumentation Laboratory; the TX-O, a noncommercial device built at Lincoln Laboratory and transferred to M.I.T. for both academic and research work at the Computation Center; a Bendix G-15 in the Naval Supersonic Laboratory; two Burroughs E-101's, one in the Aeroelasticity Laboratory of the Department of Aeronautics and Astronautics and the other at the Research Laboratory of Electronics; and three Royal-McBee LGP-30's, two in the Department of Meteorology and the other in the Research Laboratory of Electronics.

While most of the computers are for research purposes, the new machine in the Civil Engineering Department will be essentially for academic purposes, supplementing the heavy student programs already under way at the Computation Center. It will be operated as a general Institute facility on an "open shop" basis, with users furnishing their own operating personnel, or running the machine themselves. One-third of the computer time will be allocated to students taking courses in computer methods in the Civil Engineering Department, and one-third of the time will go to the School of Industrial Management. The remaining one-third will be available to other academic users throughout the Institute. Supporting equipment includes an accounting machine, sorter, reproducing punch, key punches, and verifier. The new laboratory also has placed an order with IBM for a solid-state computer to be delivered later.

"Electronic computers have become an important part of the practice of civil engineering during recent years," says Professor Miller. "The Department of Civil Engineering at M.I.T. has pioneered new solutions to engineering problems through computer methods. We have developed approaches which show the advantages of using small and medium computers at the problem sources as well as large-scale computers at central locations."

An outstanding example of a computer's value in civil engineering is the Digital Terrain System developed by Professor Miller, which has saved millions of dollars in planning and designing highways.

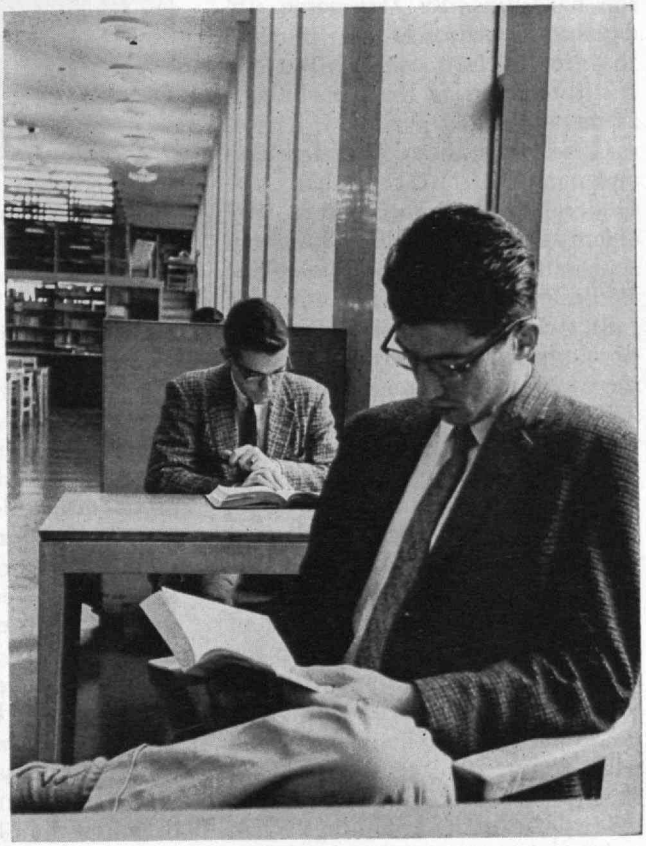
The High Cost of Journals

THE EMERGENCE of journals as the primary sources of new scientific information has posed a major problem to which W. N. Locke, Director of M.I.T. Libraries, called attention in his annual report.

"Although journals are far cheaper word for word than books, subscription rates have been going up," Professor Locke wrote. "Between 1948 and 1958, subscription rates have approximately doubled. They have gone up an average of 10 per cent in the last year alone. The story is the same for book prices. But the pinch is most severely felt in the fact that new journals must be added while subscriptions to most of the old ones are continued.

"During the year we submitted lists of the journals currently received to the Faculty Advisory Committees with the request that they eliminate every journal which is no longer needed. Some 25 out of a total of 3,053 journals currently received have been dropped. Another 20 ceased publication during the year. Only 67 new ones were added, but this is far short of the minimum needs. There is hardly a field in which important new journals did not appear during the year, most of which we were unable to buy for budgetary reasons.

"This compounded inflation of the rising cost of everything we buy and of salaries," Professor Locke concluded, "plus the need to keep up with an expanding world production of scientific literature, makes the libraries' bite on the general Institute budget all too reminiscent of the camel in the Arab's tent."



The Science Library at M.I.T. is used by more than 1,400 readers on some weekdays. Its shelves are nearly full and there is room left for less than three years' growth.

The Morale of M.I.T. Freshmen

A psychologist's report on the attitudes of the Class of 1961 reveals its high hopes and its first disappointments

BY JOHN I. MATTILL

Director of Publications

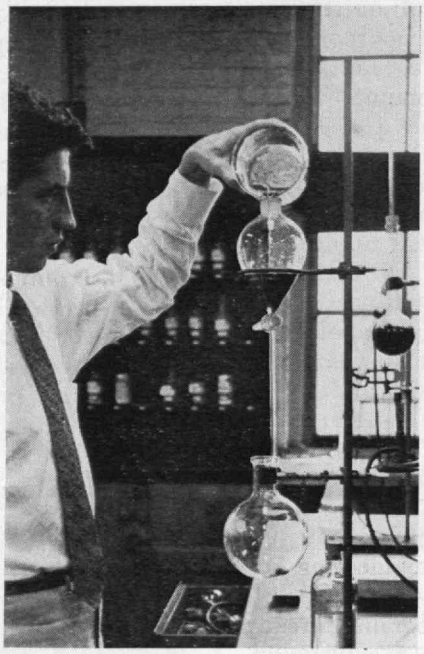
THE overriding impression of M.I.T. to the average member of the Class of 1961 as he finished his freshman work two years ago was this: M.I.T. is hard – harder than I thought it would be, so hard that I am missing a lot of the fun that I expected in my college years, so hard that I don't have time to pursue many of the ideas that come out of my courses.

But, although the class complained about the pace, most of its members agreed that the education they were getting was good, and they counted on its results to justify the hardships. By May some students approved of M.I.T. less than they had before coming, but the Institute gained in the eyes of about as many others.

Concerned about the attitudes and morale of M.I.T. students, the Undergraduate Association in 1957 commissioned Miss Leila Sussmann, Assistant Professor of Sociology at Wellesley College, to make a year-long study of the expectations and developing attitudes of the freshmen who would enter that fall.

The study began in July, 1957, when by a mail questionnaire Miss Sussmann and her group asked each member of the class about his hopes and expectations of M.I.T. and where he got them. After the class arrived some of its members were interviewed and four students kept daily diaries for the project. In the spring came reinterviews with the students first seen in the fall, and in May one-or-two-hour interviews with about 200 members of the class, picked at random.

Miss Sussmann's findings were published in a 100-page report this spring. Her conclusion: the morale of some M.I.T. freshmen is relatively low; they are mostly those



low in the class academically. But the problem "has no easy solution."

Killing Inquisitiveness?

The students who find M.I.T. most disappointing are by and large those who are ill-prepared, emotionally or academically, for its rigorous academic standards. These are the students who made outstanding records in high school without ever really learning how to study. They are the students who come to M.I.T. "with the strongest hopes for a typical 'collegiate' experience," much of which is denied them by the pressure of academic work, Miss Sussmann says.

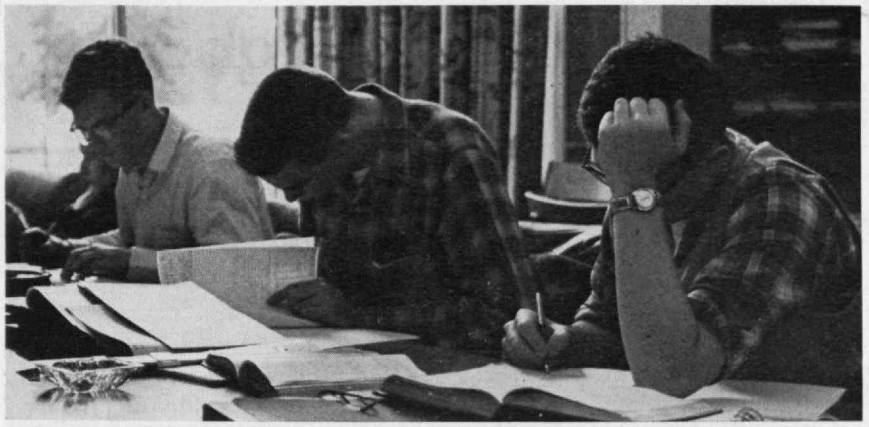
Before coming to M.I.T. more than half the Class of 1961 expected to study 29 hours a week or less; but by May, 64 per cent of the class was putting in 30 or more hours, and 27 per cent 40 or more hours. The students whose performances at M.I.T. were best were generally those who had done more studying in high school. They had learned how to study, to get full measure from their homework time.

Some students complained that the pace was so demanding that they could barely keep up with their assigned work and never had time to explore on their own. One student, perhaps overstating the case, told Miss Sussmann: "One particular segment we're doing in physics is fascinating. . . . I'd like to spend the whole semester on it. But we're moving so fast you don't have time . . . I had a tremendously inquisitive type of mind, and they've succeeded in killing all the inquisitiveness."

The Norm of "Aiming High"

Before they came, the Class of 1961 expected a lot of M.I.T. Nearly all of them spoke of its high academic reputation, many referred to its excellent Faculty and facilities. By May many still agreed that their instructors "had a masterful command of their subjects." But many – especially those whose grades were far below what they hoped for – were critical of the teaching; they felt that many members of the Faculty were so interested in research that teaching took a secondary place.

M.I.T. draws its new classes each fall from the top of the country's high school graduates. This is a group of students accustomed to ranking near the top among their colleagues, and most of them expected to continue this performance at M.I.T. Before they arrived at the Institute, 96 per cent *hoped* to be at least that high in rank, accord-



By the spring of the year the freshmen were studying more hours per week than they had expected to study before they entered the Institute.

ing to Miss Sussmann. Obviously, almost half this group was doomed to disappointment. Even after mid-years, however, when students had seen their actual first-term grades, "there were still many more aiming for the top ranks in the class than there was room for. Actually, the distribution of rank aspirations changed little."

Most freshmen in every high-ranking American college have this kind of adjustment to make. But in one respect the behavior of M.I.T. students was "strikingly different" from that of college students who have been studied in psychology laboratory experiments elsewhere: there were no "under-aspirers" at M.I.T. — no students who set their future goals lower than their past performance. This difference, Miss Sussmann believes, is partly the result of studying a real instead of a laboratory situation. But she also believes that M.I.T. recruits a freshman population predisposed to high aspirations, perhaps higher than those in most other schools. And, Miss Sussmann says, "the norm of 'aiming high' is very strong among both students and Faculty here." It is not low grades in themselves, but low grades associated with aspirations for much higher ones, which produce low morale.

Living Groups as a Factor

Before they came to Cambridge, less than one-fifth of the Class of 1961 referred specifically to the Institute's dormitories and fraternities as something to which they were looking forward. But at the end of the first year, nearly half of the class rated their living groups as a positive factor in their experience.

This does not mean that everyone was happy about his life in a dormitory or fraternity. Miss Sussmann points out that most of these favorable comments were based on the students' enthusiasm for their personal freedom, the lack of rules and restrictions. Indeed, she concludes from her interviews that "living groups at M.I.T. are less satisfactory than they might be."

She found that students who chose single rooms, presumably to be sure of having uninterrupted study time, risked finding themselves "lost in anonymity" because they had no sure way of building friendships in the large group of dormitory residents. Those who chose suites found friends but paid a price in distraction from work.

Dormitory residents were dissatisfied with study conditions, and "they failed to find in dormitory life the college spirit which so many were looking for." Thus the dormitories, says Miss Sussmann, disappointed both "the students who wanted to work very hard *and* those who wanted to have a collegiate good time."

Students in fraternities were better satisfied with their living groups. They had no complaints about a lack of friendship or group spirit, though they complained with some frequency about poor study conditions. Miss Sussmann thinks their favorable answers may have been influenced by "a spirit of loyalty."

"The most notable increase" during the year in unfavorable comment about M.I.T., says Miss Sussmann, was "the large number of students who found the Institute impersonal and lacking in school spirit. The lack of satisfying, positive ties to other people was mentioned again and again. The majority of freshmen wanted and expected college to mean something in their lives beyond the acquisition of knowledge and skills.

The Problem of Values

What they probably meant, says Miss Sussmann, is that "they went through their first year as competitive individuals or as members of a very small group of friends." A unified college community never developed. Miss Sussmann believes that this condition — apparently not uncommon in engineering schools — results from the high demands of engineering and science curricula, which leave students little leisure; and from the fact that many engineering students (and this is true at M.I.T.), coming from working-class and lower-middle-class families, are likely to be more concerned with "achieving the requisites of high occupational status" after graduation than with "intellectual and emotional experimentation."

"The problem at M.I.T.," Miss Sussmann concludes, "is to create an undergraduate community centered on values which stem from intellectual and scientific pursuits." In times when the nation needs ever-higher standards of achievement in these fields, all eyes will be on M.I.T.'s solutions to a problem which arises out of the Institute's own unique achievements.

The Story Behind Polaris

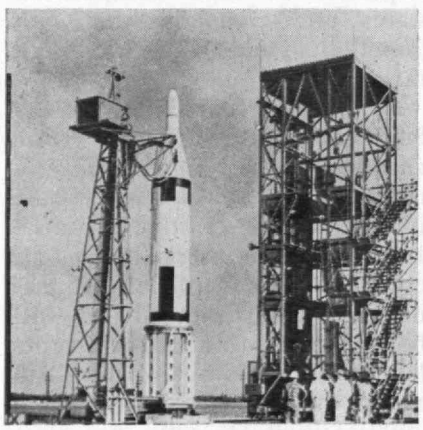
Many Alumni have worked on the new weapon system

THE MOST complex weapon system ever devised, in the opinion of experts, will become operational late this year when the nuclear submarine *George Washington* is armed with 16 Polaris missiles. Credit for two of the technological triumphs wedded in this system, the navigation of the submarine and the guidance of the missile, goes to the M.I.T. Instrumentation Laboratory.

"Only a few years ago," says Lt. Commander John B. Padgett, Jr., '54, "many technically qualified people said it was impossible to reduce the inertial guidance equipment then available to a size that would fit into a submarine-launched missile. But it has been done, and accuracy and reliability have been significantly improved at the same time."

Commander Padgett is a veteran of the submarine service and a 1945 graduate of the U.S. Naval Academy who is assigned full time to the Instrumentation Laboratory. He and another naval officer stationed there report to the Bureau of Ordnance Technical Liaison Officer at the General Electric plant in Pittsfield, Mass., where the inertial guidance systems are produced in accordance with design specifications furnished by M.I.T.

The first full-scale test of the inertial guidance system designed for the Polaris was made on January 7 and was successful; the missile flew 900 miles from Cape Canaveral. The system is similar to those designed for the Air Force's Titan and Thor missiles. Its size and weight are secret, but Commander Padgett considers the accomplishments since 1953 "phenomenal." That was the year in which Charles S. Draper, '26, Director of the Instrumentation Laboratory, made an historic transcontinental flight in a plane flown by an inertial guidance system that filled much of the cabin and weighed 2,800 pounds.



Inertial guidance represents a combination of several specialized fields of science and technology. Elements of mathematics, electronics, computer technology, mechanical design and circuit design had to be brought together to meet stringent requirements. To keep the Instrumentation Laboratory where this work was done close to M.I.T., it has been housed in an old, four-story, red brick building on Albany Street that formerly was a shoe-polish factory. The Polaris work was done mainly in a building that once was an industrial firm's garage. Three blocks west, down Albany Street, more employees of this laboratory work in what was once a wool-storage warehouse.

Key men on the M.I.T.-Polaris team under Dr. Draper have included many Alumni:

Forrest E. Houston, '48, Associate Director of the Laboratory, is a Naval Academy graduate who has been with M.I.T. since 1950 and has been a top administrative official on the Polaris project.

Ralph R. Ragan, '52, has directed technical development of the Polaris system, and occupies an office next door to the Navy's technical liaison officers.

David G. Hoag, '46, a systems

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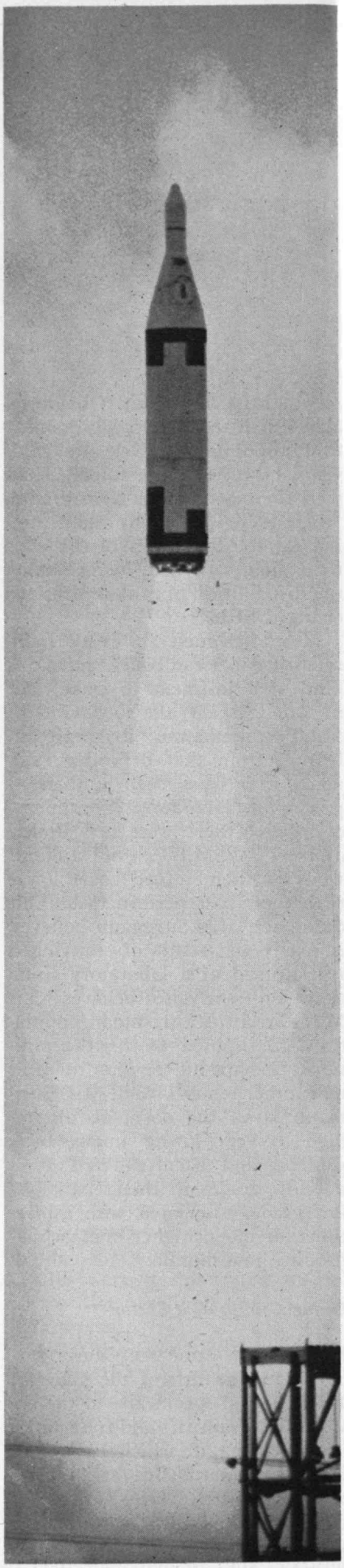


The Lady Is a Phony

The metallurgists' electron microbeam probe displays its versatility dramatically by verifying an artistic forgery

This is part of the Boston Museum of Fine Arts' modern and well-equipped scientific laboratory. Miss Florence Whitmore is adjusting an optical spectrograph in the background; Miss Alice Zacharias is using a microphotometer in foreground. William J. Young is the laboratory's director.

BEHIND a locked door on its third floor, the Boston Museum of Fine Arts has a collection of beautiful things that it never displays. Here, as well as downstairs, it has all types and all sizes of *objets d'art* from many parts of the world and many periods in mankind's history, but these are fraudulent.

They stand amid scientific instruments with which this has been proven. William J. Young, the greying gentleman who heads this laboratory, has devoted years — like his father and his grandfather — to exposing false labels. He and his colleagues in other museums and laboratories have examined many masterpieces fluoroscopically, spectroscopically, and with other modern aids to perception. But still some works of forgers hang in great museums and deceive collectors, dealers, and students of art — because of the craftiness, the talent, and the patience of the criminals who produced them.

Henceforth, fortunately, it will be easier to detect falsified art, thanks to the development of an instrument called an electron microbeam probe. Its potentiality in the art galleries was demonstrated this winter by an M.I.T. graduate student, Norman L. Peterson. With it, he proved beyond a possible shadow of doubt that a puzzling portrait of a lady which was purported to be the work of a Fifteenth Century Florentine artist was a phony.

The electron microbeam probe is so new that only a few researchers have used it. There are less than a dozen of these probes in this country and about the same number overseas. Already, however, they have revealed so much about a great variety of solid materials that the Institute will offer a special course next summer in the design and use of an electron probe.

To appreciate what Mr. Peterson did, you must know a bit about both the forger's bag of tricks and this new means of insight.

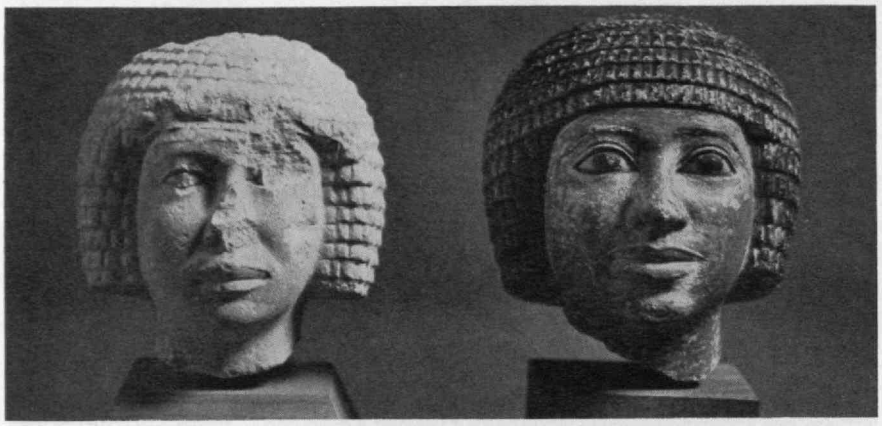
Buried Evidence

The prices now paid for ancient art are as alluring to some men as a bank's vault, and they have simulated it with incredible skill. They have pitted themselves against not only the experienced eyes of critics but also the x-rays, the microchemical techniques, and the historical and scientific records available to Mr. Young and his colleagues. The stakes for which they have played might make a Las Vegas croupier tremble. Hence the odds, to some gifted criminals, have not seemed too great.

The forger never can wholly hide clues to his deceptiveness. Some of the materials and techniques of artists in bygone days and faraway places are no longer known — the secret of manufacturing a blue found in the Palace of Knossos in Crete and in Roman wall paintings, for example, was lost between 200 and 700 A.D. But it is possible for a forger to bury the material that would betray him so deeply in layers of paint or metal that suspicious men will not dig for it.

Honest investigators, their employers, and other lovers of art often are loathe to remove even a small part of a possibly irreplaceable object for chemical analysis. Their reluctance to mar what is represented as, and looks like, a genuine artistic and historic treasure can be counted on by a talented forger. Indisputable evidence of the guilt of the painter of the lady's portrait, which Mr. Peterson exposed, lay behind this barrier to the use of conventional techniques.

Mr. Young believed that this painting was a forgery. But it was on a wooden panel which seemed authentic, and the patina on the lady's portrait looked as though it had been placed there by age. Her profile had been painted over another picture which probably was inferior — but might not this have



A genuine example of Egyptian limestone sculpture and a forgery . . .

One of these is a Chou Dynasty ting; the other is a forgery . . .

One of these is a "Greek bronze statuette of Zeus"; the other is a forgery.

Can you recognize the forgeries? *In the top picture, the forgery is on the right; in the center picture it is on the left; at bottom, it is on the left.*

been done by a Florentine artist in the Fifteenth Century?

When part of the patina was removed, the portrait seemed strikingly beautiful. Many pictures comparable to it are highly valued. Mr. Young and others who saw the painting in his laboratory wished that it could be displayed publicly. Had the lady been wrongly imprisoned in his collection of fakes? Her admirers hoped so — and some of them thought so.

Materials Research

Mr. Young learned about the electron microbeam probe as a result of his friendship with Robert E. Ogilvie, '52, Assistant Professor of Metallurgy at M.I.T. It was being used in Professor Ogilvie's laboratory to study such matters as the cladding on the fuel elements in nuclear reactors and the history and composition of meteorites. Obviously, it also could penetrate mysteries that tantalize the curiosity of aesthetes as well as physicists.

Mr. Peterson used it, for example, to analyze some brown stripes, about which artists were curious, on a piece of Egyptian faience (decorated glazed quartz) that was produced about 2000 B.C. These stripes were only about half a millimeter wide, but tremendous compared to the amount needed for analysis. They were potassium silicate, Mr. Peterson reported, and contained a wee bit of iron which produced the color.

Similarly, he analyzed a speck of 4,000-year-old Egyptian glass, which was mainly blue but had a brown pattern on it, to explain this coloring. He found that cobalt was responsible for the blue and that the brown areas contained manganese.

He also demonstrated the probe's versatility by using it to examine a bit of glaze from a statue of a boy which was made in Whittington in the Eighteenth Century. After mounting this flake of material in bakelite, polishing it, and placing it in the instrument properly, Mr. Peterson reported that this glaze was mostly lead, but contained small amounts of zinc and iron.

The great advantage of the instrument was that not only a qualitative but also a quantitative analysis could be made of an extremely small piece of material. A mere sliver, thinner than a human hair,

would suffice. This was why the metallurgists were using the probe. They had found that with it they could trace the migration of one metal into another when two metals were bonded together and this, to them, was far more fascinating than the skulduggery of some artists.

This suggested to the metallurgists that they could employ the probe to explain the aging of metallic objects. With a sample of ancient bronze, Mr. Peterson found that the difference in the chemical activity of copper and tin had resulted in significant changes in the course of time. The tin had diffused outward, and had been leached away from the surface, where a copper oxide layer was formed over a tin oxide layer.

Professor Ogilvie pointed out while these experiments were being performed that the soldering in ancient objects also could be analyzed, and dated approximately by noting its diffusion into the material on which it had been placed. Work done to restore an ancient work of art might thus be disclosed. But might not a forger fool later investigators by holding his work at a high temperature before offering it for sale? No, because the diffusion gradient of, say, tin in copper, would differ in an item that had been annealed for a short time at a high temperature from that in one in which the diffusion had taken place at room temperature for a number of centuries.

Before a large picture such as the lady's portrait could be tested with an electron microbeam probe, however, a way had to be found to obtain a suitable sample of the material in it. Mr. Peterson revealed how this was done at the Chicago meeting of the American Association for the Advancement of Science.

How It Works

Some of the newspaper accounts of his work which were published then implied that an electron microbeam probe was a relatively simple little gadget. Actually, it is a large, complex, and very expensive instrument. In it, a finely focused beam of electrons is used to excite atoms. The radiation that these atoms then emit is analyzed to determine both what the atoms are and where they are. Such delicacy is not easily attained.

This is an electron microbeam probe. The electron gun is at the top of the upright tube. It sends a beam of electrons down toward the specimen, which is put in place with the help of an optical microscope.

One of the first electron probes in this country was made out of an electron microscope. It was designed by Victor G. Macres, '53, an assistant professor at Stanford University, and Professor Ogilvie. More have been built since at M.I.T. for the study of semiconductors, ceramics, precipitates in steel, and similar matters.

A French physicist, R. Castaing, developed the first electron microbeam probe in 1951, on the basis of the discoveries a few decades earlier of two famous Englishmen, W. H. Bragg and H. G. J. Moseley, regarding atomic phenomena.

Mr. Bragg found that, on the continuous x-ray spectrum that is emitted when a target is bombarded with high-speed electrons, a line-emission spectrum is superimposed, and that this line-emission spectrum has wavelengths that are characteristic of the elements in the material in the target. Mr. Moseley found a simple explanation of this: The higher the atomic number of the element that the electrons hit, the shorter the waves are, and the intensity of each characteristic wavelength is determined by the amount of the element in the target. The law which he formulated helped the chemists fill two of the blank spaces in their periodic table of the elements, and led later to the invention of the probe with which Mr. Peterson studied art.

Like a television tube, the probe contains an electron gun that shoots out a stream of electrons. As in an electron microscope, this beam is focused magnetically. Two magnetic lenses concentrate it on a very small area. To help you get whatever you want to analyze into this tiny area, an ordinary optical microscope is combined with the electron optical system.

The electron probe then does more for you than either a television tube or an electron microscope: Instead of merely giving you a picture of what's there, which might fool you, it tells you what is in whatever you are looking at. This is the part of the apparatus in which Mr. Moseley's discovery, regarding the x-rays emitted when high-energy electrons hit something, is put to work.

But how, you may wonder, is this done? How can the waves in

the radiation be sorted out and its parts measured separately? This is done by a mechanical maneuver as beautiful as a double play in baseball.

The x-rays that fly out of the target are intercepted by a crystal. It reflects them to a counter. This crystal is mounted on a hub of a wheel within a wheel. An electric motor turns these wheels while the x-rays are flying from the specimen to the crystal to the counter. Turning the wheels changes what the physicists call "the angle of diffraction," and the direction in which the crystal is facing determines which x-rays get to the counter. First, those with a short wavelength reach it. Then, as the crystal is turned, those having slightly longer waves get there, and so on and on.

By this scanning process, the parts of the radiation that are characteristic of different elements are distinguished, and the rest of the business is relatively simple. Circuitry of a quite customary sort is used to measure the intensity of the radiation reaching the counter while the crystal is turning, and a wiggly line is drawn on graph paper. The peaks on this line tell the operator what is in the specimen sending out the x-rays.

With the M.I.T. metallurgists' instrument, any element that is between magnesium and uranium in the periodic table can be found in an object that is only a micron (one-thousandth of a millimeter) in diameter.

The Evidence Obtained

The sophisticated example of art forgery which Mr. Young asked Mr. Peterson to investigate with this sophisticated device is about four times the size of a page of this magazine. How would you go about determining the authenticity of a painting that big with an instrument built to study things so tiny that you could put them in your eye and never feel them?

This was done the same way that a geologist finds out about parts of the earth which he cannot reach — but with a tool originally made for physicians to poke into their patients: A "core" of the material in the painting was extracted in a hypodermic needle. The finest needle on the market was used, and it was jabbed right into the lady's cheek.

You cannot see the hole that it left unless you stand very close to the picture and ask Mr. Young to point it out to you. Even so, the core that came out in the needle was 50 times as wide as really was needed. Finer needles can be made and the holes left — when pictures must be tested this way in the future — can be so small that they will be completely invisible to an art connoisseur's unaided eyes.

The next problem that confronted Mr. Peterson was how to expose the paint and other material inside the needle to the finely focused beam of electrons inside his instrument. This had to be done without contaminating or mixing the pigments. So Mr. Peterson filed away one side of the needle. Then he evaporated a thin layer of aluminum over this shred of evidence, in order to carry off the current of the electron beam, and thus prevent a charge from being built up that might deflect it.

A painting is a stratified structure, and when he placed this specimen in the probe, he could see distinct layers of paint with the help of the optical system. He was able, therefore, to focus the electron beam on these layers one at a time, and find out what was in each one.

The Analysis

The artist had covered the original painting with a layer of white. To give the lady her fine complexion, he also had mixed some green on his palette, and his brush had left a layer of it where the investigator's hypodermic needle pricked her cheek.

When the electrons were focused on the white layer, and the x-rays from it were scanned, Mr. Peterson saw that this white paint contained titanium. Similarly, when he focused the beam on the green part of the core, he saw that it contained chromium, and more titanium. It

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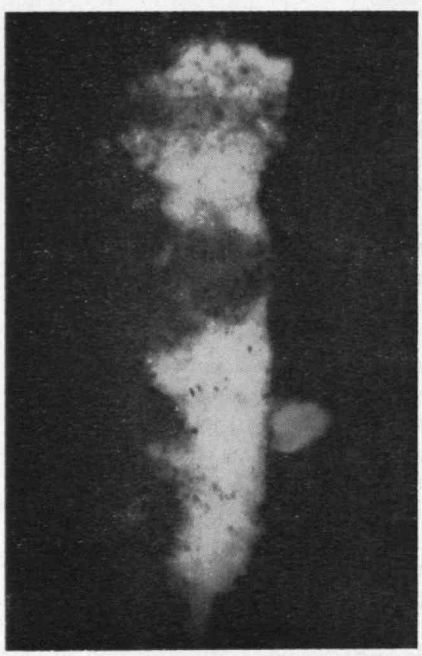
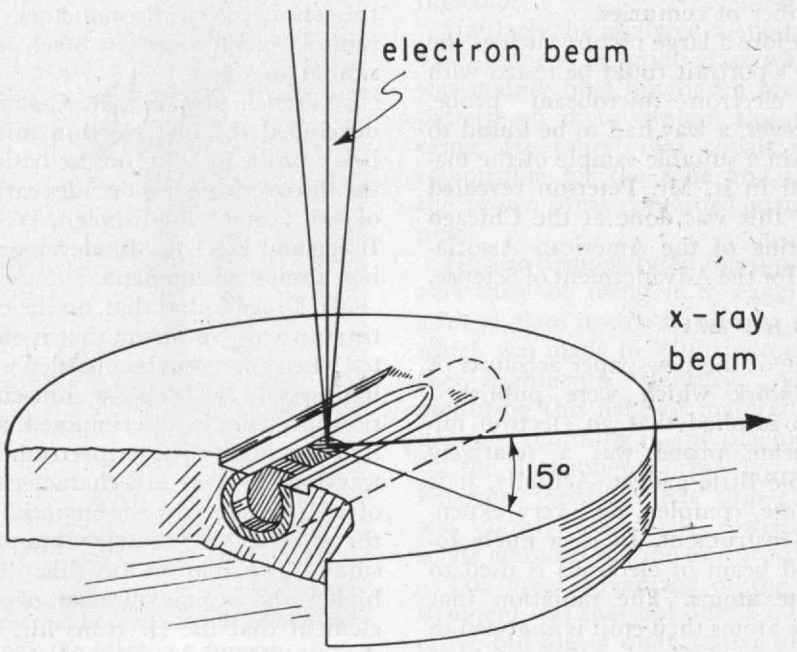


This is an enlarged photo of the "core" of material taken from the painting.



This drawing shows how the needle was filed and a sliver of material from the painting was exposed to the electron beam to analyze it layer by layer.

Factors in Scientific Strength

Innovation is influenced by a society's attitudes, its government's policies, and the quality and orientation of education

BY JAMES R. KILLIAN, JR.

(With sketches by Walter H. Lorraine)

On his recent world tour, the Chairman of the M.I.T. Corporation participated in an International Congress of Scientific Management at Sydney, Australia. The article which follows consists of excerpts from the paper Dr. Killian prepared for that conference.

THE USE of systematic scientific research for the creation of new knowledge and new technology, especially new industrial technology, is one of the most striking and most dynamically influential features of our time. Because this is widely recognized as true, because the economy, the health, and the vitality of nations are so profoundly affected by purposeful innovation, we witness today more perceptive attention to the factors which promote and sustain scientific strength.

At the risk of being pedantic, I wish to emphasize how innovation is inescapably influenced by the traditions and attitudes of societies, by the policies of governments, and by the quality and orientation of education.

Perhaps one of the most important constellations of attitudes and values which underlie scientific advance is the concept of progress which has been so central in Western civilization. This civilization has demonstrated a sustained eagerness to find better ways of doing things, together with the deep conviction that life does not have to be static, that movement toward improvement is possible. The revolution of modern man has been a revolt against things as they are when there are ways of doing things better. It has been a revolution against all of the forces which hinder man in seeking a better life. Science has had a major part to play in shaping this faith in creative change and improvement.

Scientific creativity, creativity of all kinds, is responsive to the values placed upon change and is deeply affected by willingness to recognize and support the gifted individual. These philosophical ideas of individual creativity and progress underlie scientific advance. The management of research is the art of providing optimum opportunity for creative people to produce change and progress.

Government's Contribution

Government policy and organization with respect to science is a second factor warranting emphasis in discussing a benign, ambient environment for research.

Governments of most great nations have large research programs of their own to manage; in addition, they sponsor research in nongovernment institutions and generate policies which either encourage or discourage research.

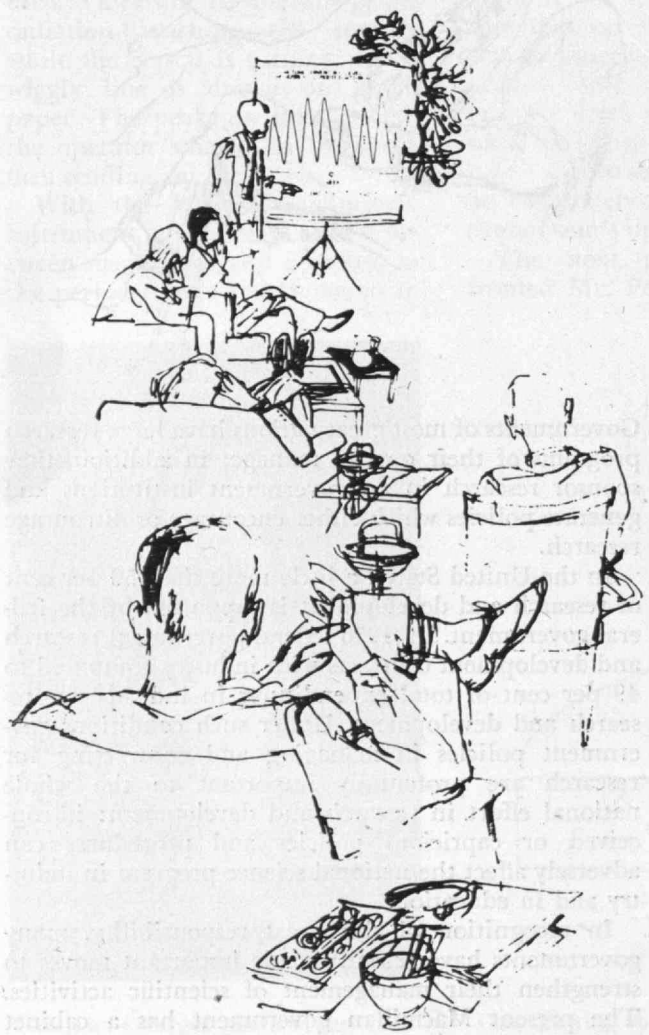
In the United States, a little more than 50 per cent of research and development is supported by the federal government. In 1956 federal government research and development contracts with industry amounted to 49 per cent of total expenditures in industry for research and development. Under such conditions government policies in managing and contracting for research are profoundly important to the whole national effort in research and development: ill-conceived or capricious policies and procedures can adversely affect the national science program in industry and in education.

In recognition of this great responsibility, many governments have recently made important moves to strengthen their management of scientific activities. The present Macmillan government has a cabinet officer, Viscount Hailsham, specifically responsible for

the government's science programs. In the United States, President Eisenhower, in 1957, appointed a Special Assistant to the President for Science and Technology. He also appointed the President's Science Advisory Committee, reporting directly to him. By these actions he sought to make available for himself and the other principal policy-making officers of government sound scientific advice, with the object of strengthening the government's own science programs and policies, identifying fields of science and technology requiring co-ordination and greater effort, and improving the government's policies and procedures for dealing with nongovernment institutions.

In one of its recent reports, "Strengthening American Science," the President's Science Advisory Committee made numerous recommendations for strengthening and clarifying the research policies of the government. One of these, which was promptly put into effect by the President, was that there be established a Federal Council for Science and Technology, the members of which should be policy-making officers from those government departments and agencies which have large scientific and research responsibilities.

Both this Council and the President's Science Advisory Committee have given much attention to those areas of the nation's science and technology which warrant greater effort on the part of all involved institutions, government and nongovernment. Materials science and engineering is a current example of a field where the federal government can encourage a greater concert of effort; it can provide such encouragement by stimulating more work in its own laboratories, in industrial research organizations, and in the universities, where the establishment of interdepartmental materials research centers can increase the output of scientists and engineers oriented toward materials research and development. If the government can help in encouraging national effort in such a field of opportunity, it can help industry as well as meet its own needs.



Australia provides an impressive demonstration of enlightened government sponsorship of research. The Commonwealth Scientific and Industrial Research Organization (CSIRO) has proved itself a great national resource, an instrumentality which has made notable contributions to basic and applied science and to the advancement of agriculture and industry. Other nations can profit much from observing the policies and procedures which have made it so effective – its freedom from political influence, its success in encouraging co-operative industrial research groups, its high level of scientific attainment, its important contributions to the advancement of such fundamental fields of science as radio astronomy.

One might appropriately note, too, that the new science of radio astronomy, to which the Radio Physics Division of CSIRO has contributed so importantly, had its scientific origins in a discovery made in an industrial research laboratory. CSIRO is a telling example of the importance of sound government policies and research management to a country's industrial and agricultural advance and to the enrichment of its science and technology.

Education's Contribution

The quality, level, and orientation of education is another factor upon which creativity greatly depends in any country. The existence of strong engineering schools of really professional caliber, whether a part of universities or separate from them, and the availability of first-rate graduate schools of both science and engineering are essential to nurture the professional engineers and scientists and to provide the centers of basic research which technically based industries require. The engineering profession has been retarded, and so has industry, in those environments where engineering education and technology itself have been only grudgingly accepted and developed within the university system.

It may be anticipated that marked changes in engineering education are impending and are, in fact, imperative. Engineering courses are tending to embrace more basic science and mathematics, to become more open-ended, and thus to educate engineers who are less narrow, more versatile in their engineering competence, and more broadly prepared for the nontechnical tasks of their profession. Engineers who have the capacity for synthesis, for systems management, must be educated in greater numbers.

A close relationship and understanding between education and industry, with each stimulating the other,

is important to the maintenance of a flourishing technology. Important, too, are the institutions below the level of the universities, the institutions which educate technicians, and the schools which provide the general education before students go on to universities or start their careers. Adequate science instruction in these secondary schools is of fundamental importance, not only in identifying and preparing talented young people for science and engineering, but also for achieving a widespread scientific literacy among all citizens.

These factors of attitude, tradition, public policy, and education are fundamental to the furtherance of innovation and to the maintenance of technological strength. They are the components of a nation's "system" of purposeful innovation, and the system does not function best without every component being carefully designed so that it fits and works together with the others. They need the understanding and attention of leaders in industry, government, and education if a country is to take full advantage of the scientific revolution which is now so profoundly affecting the life and economies of all nations.

Management's Importance

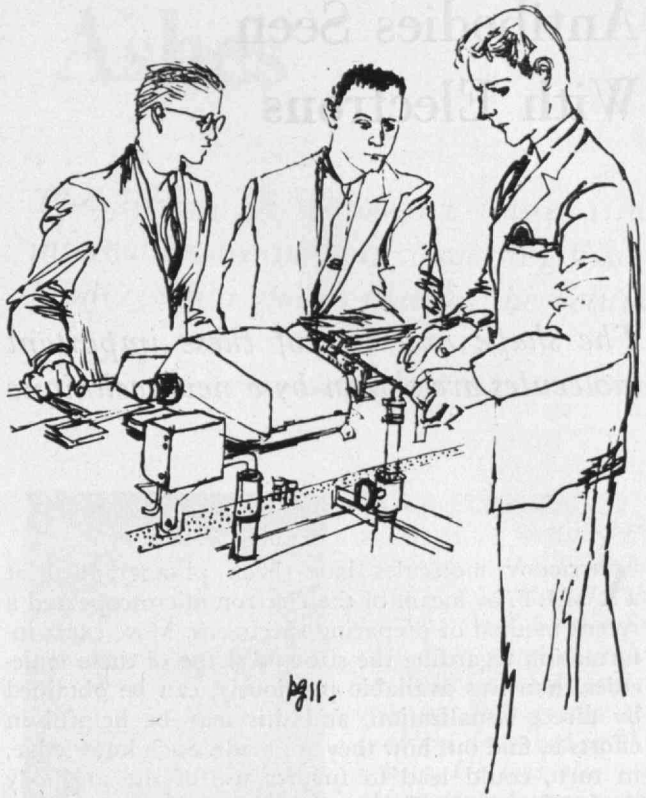
In this connection it is appropriate to emphasize that the comparative scientific strength of countries can change; especially can a country lose ground rapidly or advance its position rapidly. In partial evidence let me summarize in the following table the distribution of Nobel Prizes in science since they were established.

NOBEL PRIZES IN SCIENCE

(Expressed in percentages)

Nation	*1901 1910*	*1911 1920*	*1921 1930*	*1931 1940*	*1941 1950*	*1951 1958*
United Kingdom	17	16	23	19	21	20
Germany	33	40	32	24	16	7
France	21	16	9	9	0	0
United States	4	6	9	24	37	47
U.S.S.R.	4	0	0	0	0	13
Other Nations	21	22	27	24	26	13

Clearly the art of research management must command more systematic attention on the part of industry, government, and other institutions engaged in purposeful innovation. The growing dependence of both nations and industries on successful research



together with the urgent necessity to use effectively the sharply limited supply of creative scientific talent in the world has put a high premium on mastering the art of research management.

Until now — when the Free World finds itself facing well-planned and able technological competition — research too frequently has been viewed as a kind of magic; or else management, not having penetrated its mystique, has viewed it with a romantic awe and taken it on faith. In other front offices, research has been looked upon as a mysterious black box which could be bought off the shelf and equipped with a button, which when pressed, yielded spectacular and profitable results. Such a concept of research is an open sesame to disaster.

In truth, research is not an occult art, but neither is it one that can be easily or casually mastered. It is a complex undertaking of human beings where success is dependent primarily upon high talent and secondarily on subtle factors of environment, of motivation, mission, and communication, of freedom and leadership. As a growing number of companies around the world have shown, there is, indeed, an achievable and transmittable administrative art for achieving sustained creativity, but as many other institutions have discovered, to their sorrow, this art of research management is one in which rigid or conventional concepts of management can be disastrously inadequate.

In an environment of "rising expectations," the cultivation of science and engineering in all their aspects is one of the principal means for advance and one of the principal hopes for man to realize a greater scope, a greater fulfillment of his human potential, a greater freedom, an augmented poise and dignity. Industrial science, in the hands of imaginative and creative management, holds this great promise and challenge today.

Antibodies Seen With Electrons

The shape and size of these important molecules are shown by a new technique

ANTIBODY molecules have been photographed at M.I.T. by means of the electron microscope and a recent method of preparing specimens. More exact information regarding the size and shape of these molecules than was available previously, can be obtained by direct visualization, and this may be helpful in efforts to find out how they are made. Such knowledge, in turn, could lead to further use of the antibody mechanism in medicine.

Studies over the last 40 years have shown that these "defenders" are generated in response to the presence of "invaders" called antigens. The antigens may include bacteria, their toxins, foreign red-blood corpuscles, tissue extracts, pollens, dust, and viruses. When the antigen enters the blood stream, the antibody is formed and combines with it, thereby removing the antigen. The production of antibodies is the basis of vaccination and the immunization process. Antibodies still are found circulating in the blood after antigens apparently have vanished, and humans remain immune to certain diseases long after the infection or the injection of a vaccine.

A Lock and Key Problem

A still puzzling feature of antibodies is that they cannot be told apart except by their reactions with antigens. In rabbits, whose antibodies have been studied most extensively, the antibodies and gamma globulin (the blood fraction that is believed to contain most antibodies) are indistinguishable. In antibody-antigen reactions, nevertheless, a "defender" is formed and combines with an "invader" in a relationship so specific that scientists compare it to a lock and key. The antibody created by the Salk vaccine, for example, will protect a person against only one antigen — polio. To see how, and why, efforts are being made to learn which part of the attacking antigen molecule is involved in the formation of its related antibody. One current belief is that the invading foreign molecule or a part of it may act as a template, and that the antibody's components string themselves together according to the arrangement of the atoms and molecules of the antigen. The electron microscope may contribute to the understanding of such phenomena by producing photos like the one on this page.

The recent work done with it at the Institute has been described in the *Journal of Biochemical and Biophysical Cytology* by Dr. Alfred Nisonoff of the Roswell Park Memorial Institute at Buffalo, N. Y., and Cecil E. Hall, '48, and Henry S. Slayter, '53, of M.I.T. Dr. Hall is an associate professor of biophysics and Mr. Slayter is a research assistant at the Institute.

Their photographs show large molecules of rabbit antibody and gamma globulin. This rabbit antibody was purified and prepared by a method developed by Dr. Nisonoff and Dr. David Pressman, the chief of biochemistry research at Roswell Park. An electron microscope technique developed by Professor Hall made it possible to measure the lengths and diameters of individual molecules of the antibody and gamma globulin by means of these pictures.

This involved spraying a solution of antibody on a mica surface, then evaporating particles of platinum in such a way that they piled up against the antibody molecules like snow drifting against a fence. The size and shape of the molecules were learned from the shadows cast by the platinum drift. This snow-fence effect and its shadows were photographed at a magnification of 15,000, and the measurements were made from prints of more than 100,000 magnification.

The Shape Is Cylindrical

The antibody and gamma globulin look alike in the photos, as expected, and consist mainly of asymmetrical rod-like particles about one-millionth of an inch long and from one-tenth to one-fifth as wide as they are long. The average dimensions found from the pictures agree with those deduced by other methods. But it was assumed that the molecules would have an egg shape, and the photos indicate that their shape is more nearly that of a cylindrical rod. This is an observation that may be useful in determining the steps in antibody formation.

Dr. Nisonoff has pointed out that the electron microscope may make it possible to locate the combining sites of antibodies, and the authors say that other work done with the electron microscope suggests the possibility of following antibodies as they build themselves up along foreign molecules, neutralize them, and remain on to confer immunity to infection.

Tomorrow's Hot Ashes

The disposal of radioactive wastes is an international problem; converting fission products into glasses reduces the volume

BY ROLF ELIASSEN

THE rapid growth of electrical power requirements, and the impending shortage of fossil fuels, virtually assure the nuclear power industry's future. The disposal of the radioactive wastes from this industry poses an international problem of such magnitude and complexity that research is imperative. The progress to date has been very satisfactory, but much remains to be done in several related scientific disciplines.

In the United States, electric power generation is expected to grow from the present installed capacity of 140 million kilowatts to 514 million kilowatts in 1980.[1] It also will grow, of course, elsewhere in the world.

By 1965 world-wide production of oil, which now amounts to four billion barrels per year, is expected to fall far behind the demand for it. Eugene Ayres has estimated that the United States production of oil will reach its peak in 1965; that natural gas production probably will begin to decline in 1970; that oil shales and tar sands will yield only a brief supply of oil; and that the bituminous coal supply of the United States will be greatly depleted by 1970, so that its rate of production will decline rapidly after that. "All the signs indicate we are within sight of the end of the fossil fuel era on our planet," he has written.[2]

Nuclear energy is the obvious source to which men will turn. By 1980, it is currently estimated, the United States will be generating from 100 to 175 million kilowatts of its electric power from nuclear fission. Reactors with this capacity would produce about 1,500 pounds of fission products per day.

Radioactive Wastes

Fission products have been likened to ashes; they will put out the fire unless removed. Power from fission involves a controlled chain reaction which will cease if all the neutrons are absorbed by other materials such as fission products.

It is common practice to use a fuel burn-up of about 120,000 kilowatt hours per pound of uranium before separating the fission products (the ashes) from the uranium and plutonium (the active fuel). Chemical means of separation are used. Strong acids such as hydrochloric, nitric, and hydrofluoric dissolve the cladding materials and the fuel elements. This is followed by organic solvent extraction of the fissionable material as plutonium metal solution and uranium oxide. Storage for a year of the waste that remains then permits the short-lived radioisotopes to decay.

ROLF ELIASSEN, '32, is Professor of Sanitary Engineering at M.I.T. He has been a consultant to the International Atomic Energy Agency, and attended an international conference in Monaco on the problem described in this article. He was also one of the contributors to the Handbook of Radiation Hygiene *(published by McGraw-Hill, 1959).*

Even after a year's decay, however, the radioactivity of the wastes now foreseen would be 100 billion curies per year. This is equivalent to the rate of disintegration of 100 billion grams of radium.

Compare this, please, with the tolerance value of mixed radioisotopes in water: The maximum permissible concentration is one ten-billionth of a curie per liter (principally because of the toxicity of strontium-90 and cesium-137). And the tolerance value in air is one ten-thousandth of the volume for water!

It would take all of the oceans of the earth to dilute one year's production of these wastes to the tolerance value. Discharging of these high-level wastes to the air or ocean, therefore, is not feasible. The users of atomic power will have to control the disposal of liquid wastes carefully to avoid contaminating the air, the ground, or the water resources of the world.

This applies to the users of mobile units as well as to operators of stationary reactors. Within the foreseeable future, about 200 naval vessels and 100 merchant vessels will be nuclear powered. The U.S. Navy has drawn up strict regulations to control the discharge of low-level fission product wastes in harbors and estuaries. Other countries, of course, are preparing similar regulations for their harbors and waterways.

The disposal of nuclear wastes in the open sea will be limited to low-level liquid and solid wastes. These have been placed in containers and sunk in 1,000 fath-

[1] Jackson, N. P., "Atomic Energy and the American Economy," *Journal of the American Water Works Association*, 47:1139 (1955).

[2] *Scientific American*, 195:43 (Oct., 1956).

oms of water. Low-level liquid wastes are discharged through pipelines in the coastal waters of the Irish Sea near England, but this is not likely to be done in the United States.

International conferences have been held under the sponsorship of the United Nations to draw up controls for the sea disposal of radioactive wastes. Eventually these controls will be assigned to the International Atomic Energy Agency with headquarters in Vienna.

The Tolerance Values

The object of these controls will be to assure that the tolerance value to human beings will not be exceeded. A critical tolerance value may be in the water that people consume or use for recreation, or in the fish harvested as food, or in the edible plants in which some radioactive substances may be concentrated after the plants have been irrigated.

How are tolerance values determined? The International Commission on Radiological Protection has established what are called "M.P.C." (maximum permissible concentration) values for the United Nations, and the National Committee on Radiation Protection and Measurements has established values for the United States. These, in turn, have been based on the decision that the maximum permissible dose to the entire population shall be five roentgens over a 30-year span. A roentgen is the unit of radiation energy causing tissue to absorb 93 ergs per gram.

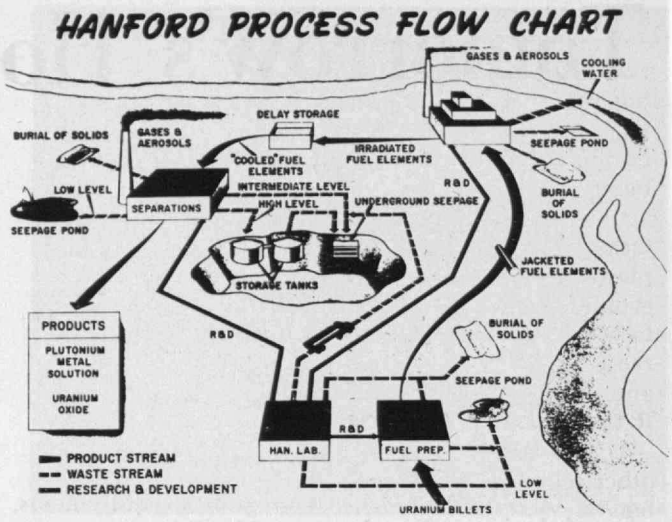
The reproductive organs (gonads) are the critical factor in determining tolerance values because they are the most sensitive part of the body to radiation. Professor George W. Beadle has estimated that this dosage will produce 0.33 mutations (children born different from normal) per 100 births.[3] He also has projected this selected mutation rate to include the probable number of new mutations in the United States and the world:

INDIVIDUALS BORN WITH NEW MUTATIONS

Cause	*Mutations per 100 births*	*In U.S. per year per 4,000,000 total births*	*In world per year per 80,000,000 total births*	*Generation per 2,400,000,000 total births*
Spontaneous	2	80,000	1,600,000	48,000,000
Fallout radiation	0.02	800	16,000	480,000
Medical radiation	0.2	8,000	160,000	4,800,000
Maximum permissible radiation dose to entire population	0.33	13,000	270,000	8,000,000

The last column presents a most formidable series of numbers and indicates the penalty we may have to pay for living with radioactivity. It gives rise to the philosophical question whether any council of men, be

[3] *Scientific American*, **201**:219-231 (Sept., 1959).



This Hanford process flow chart was presented in the hearings on Industrial Radioactive Wastes Disposal of the Joint Committee on Atomic Energy of Congress [1:394 (1959)].

they national or international experts, has the right to predetermine the fate of so many newborn.

Allotment of Radioactivity

Cosmic radiation contributes an average of 0.1 roentgens per year, or three roentgens by the time a person is 30 years old (the mean age of childbearing). Medical radiation to the region of the gonads will be on the average three roentgens in 30 years. These exposures are not included in the five-roentgen M.P.C. value; they are either beyond man's control or necessary. Cosmic radiation may be a contributing factor in the spontaneous mutation rate shown in Professor Beadle's table. Fallout has averaged 0.01 roentgens per year; if continued on the same basis, it would use up 0.3 roentgen of the total allotment. That leaves a 30-year genetic dose of 4.7 roentgens to be allotted to future developments in peaceful uses of the atom.

One of the allotments is for the contribution which disposal of radioactive wastes will make to the environment. Last July the International Atomic Energy Agency tentatively allotted one twenty-fifth of the M.P.C., or 0.2 roentgens per 30 years, to disposal of wastes in the ocean. In the case of the discharge of low-level wastes from the Windscale installation into the Irish Sea, it was found that plaice (the bottom-feeding fish) was the critical factor in determining the allowable concentration of radioactivity in the outfall sewer and in the waters within a five-kilometer radius of influence.

Low-Level Wastes

When the radiation intensity from waste material is less than one millicurie per liter, the wastes are "low level." Such wastes may come from the mining and processing of radioactive ores, from research laboratories and hospitals using radioisotopes, from nuclear reactor cooling air or waters, or other sources.

Isotope users obtained 437,000 curies in 93,000 separate shipments during the years 1946 through 1958 from the Oak Ridge National Laboratory, the AEC's primary radioisotope supplier. The industrial uses of isotopes have multiplied and are estimated to have

saved major industries $40,000,000 a year. Most of these industrial uses do not yield any significant wastes.

Treatment for removal of radioactivity, or retention to allow for the decay of activity may be necessary, however, before low-level wastes are discharged to the environment. The Hanford reactor cooling waters, for example, are passed through retention basins before being discharged to the Columbia River, and radioactivity decays quickly in the basins and downstream. Other low-level wastes from the chemical processing plants at Hanford are discharged into the soil. The ground water is several hundred feet below the surface, so the sands have an opportunity to absorb the radioactive metallic ions by a cation exchange process, and thus far no activity has entered the Columbia River by percolation through the ground.

Discharge to the environment is also practical from other sources. The quantities discharged will vary, depending on available dilution and the proximity of the points of discharge to centers of population and other users of water, and a continuing program of radiation monitoring will be necessary to keep the radioactivity within the maximum permissible limits. Surveys of aquatic life in streams in this country that now are receiving radioactive wastes have not shown any dangerous reconcentration of radioactivity either from depositions on sands and river bottoms or from concentration by the algae and other plankton on which fish feed.

High-Level Wastes

The processing of nuclear fuel elements yields high-level wastes which must be stored for centuries before there is sufficient decay to permit release to the environment. The amount of these wastes now stored in underground tanks is estimated to be approaching 100 million gallons, and the contained radioactivity is measured in hundreds of millions of curies. These storage facilities are complex — precautions must be taken to control corrosion, temperature, and off-gases — and the cost is about two dollars per gallon of capacity. A better solution for permanent disposal must be found.

Volume reduction is a major problem. The AEC has sponsored waste disposal research at M.I.T. under my general direction for a number of years, and success has been achieved in the development of processes to reduce volumes by factors ranging from 5 to 20.

Wastes containing acid fission products and such cladding materials as aluminum, stainless steel, and zirconium have been converted to glass by the addition of silica sand, lime, and other fluxing agents and heating to 1400 degrees C. Water and acids are driven off, and a molten glass is formed and turned into a clear glass by sudden cooling. The cost of doing this can be less than two dollars per gallon.

Many tests have been made to develop glasses which will have a high retention of cesium and strontium, even in the presence of boiling water. Stable glasses can be stored in simple vaults or in abandoned salt mines.

Other means of reducing the volume of high-level wastes by sintering and fluidized solids processes also are the subject of experiments and pilot plant studies in this country. The feasibility of direct disposal of liquid wastes to salt mines is being investigated, too. There are vast abandoned caverns of this kind in many parts of the country.

The International Problems

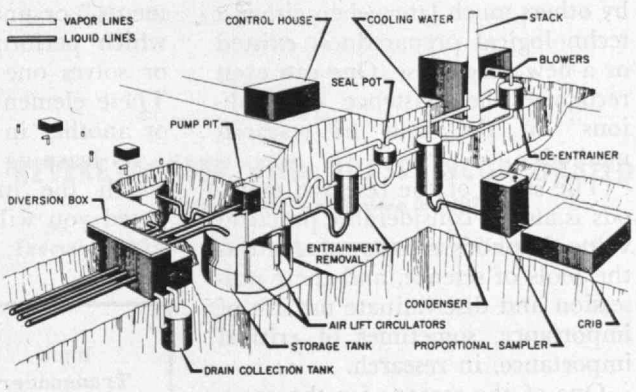
Russian engineers whom I met as a consultant to the International Atomic Energy Agency were interested in the results being obtained at M.I.T. and discussed similar results which they have been obtaining. Their expectation appeared to be that all radioactive wastes would be converted to glasses for controlled disposal.

At the recent International Conference on Radioactive Wastes Disposal in Monaco, the Japanese, Russian, Italian, and Canadian delegates were critical of the French, British, and United States policies. The Japanese complained of radioactive contamination of the Japan Sea from the Eniwetok weapons tests; and the Russians claimed that this had proceeded northward to the Kamchatkan Peninsula where they said fish were being contaminated. The Italians protested against the discharge of any radioactivity by the French into the streams leading into the Mediterranean because they feared contamination of their basic food supply. The Canadians raised objections to the discharge of wastes by the United States into the Columbia River because of claims that British Columbia's salmon industry was being affected. Neither the degree of contamination nor the possible effect on the public eating the fish was made clear by those protesting.

The International Atomic Energy Agency may become the arbiter in international disputes involving the discharge of radioactive wastes into coastal waters as well as to the open sea. The usefulness of this agency affiliated with the United Nations and the World Health Organization may be great.

Much research must be done by oceanographers, by sanitary engineers, and in other disciplines before definite answers can be given to many of the new international questions. Such work is being pursued actively by many research and development organizations, in several countries, and the progress being made is encouraging. I believe that advancing technology in the processing and disposal of airborne, liquid, and solid radioactive wastes certainly will keep abreast of, and probably forge ahead of, the prophesied rate of growth of mobile and stationary nuclear power plants and the attendant fuel-processing facilities.

WASTE STORAGE FACILITY ARRANGEMENT



A waste storage facility arrangement is complex and costly.

The Elements of Instruments

The logical grouping and coding of the parts of tools used in scientific research is helpful in several ways

BY KURT S. LION

KURT S. LION, Associate Professor of Applied Biophysics, received his doctorate at the Technical Institute in Darmstadt in 1932 and began his teaching career there. Later he held important posts at the Turkish State University in Istanbul and the University of Fribourg in Switzerland. Since 1941 he has been on the M.I.T. Faculty. This summer he will offer a course in biological and medical research.

TUCKED away on the shelves of our libraries, in countless books, periodicals, reports, or patents, is information about the methods that scientists are using or have used in their work. It describes the experimental systems they have employed, and the physical properties of these systems that are theoretically expected and experimentally realized.

Many of the excellent and ingenious methods and systems that have been devised bear the names of their inventors — Wheatstone's bridge, Rutherford-Geiger's counter, Michelson's interferometer, to name just a few examples. Numerous research workers have been awarded the Nobel prize for the development of new instruments or new methods; lately, for instance, Heyrovsky was honored for the development of the polarographic analysis method and Cerenkov for a nuclear counter.

Elements of Instruments

The study of these methods can be fascinating and rewarding. There are crude and refined methods, some that make us smile and others that we call "elegant." Some ideas are formed and are carried to perfection by generations of research workers. Other methods that were proposed early were taken up by others much later when either a technological preparedness existed or a new need arose. One can even recognize the existence of "fashions" in the field of research methods.

The study of the research methods is also of considerable practical value. Methods can be regarded as the tools of science, and their possession and discriminate use are of importance, sometimes of critical importance, in research.

One of the reasons for the enormous advances of the physical sciences is the natural coherence and logic with which the single observed phenomena fit together and form a unified field. The field of research methods also shows a clear pattern. The single research methods described in the literature can be grouped to form a unit that has all the characteristics of a science, the Science of Instrumentation. And a logical organization is important, not only because it permits an adequate coverage of the entire field without omissions or duplications, but also because it makes teaching of physical research methods that much easier.

Walk along the halls of M.I.T. and look into the different research laboratories. You will see thousands of instruments and it will seem impossible ever to master all these instruments and methods. Now it is not necessary to become familiar with all these instruments. All instruments are composed of "elements," or units or blocks, each of which performs a particular task or solves one particular problem. These elements recur in one form or another in all instruments.

By learning the "elements" from which the instruments are composed you will have at your command not only all the instruments that exist but a great many more. Learning the "elements" is comparatively easy, because their number is limited.

Three Basic Types

In the field of electrical instruments there are only three basic types:

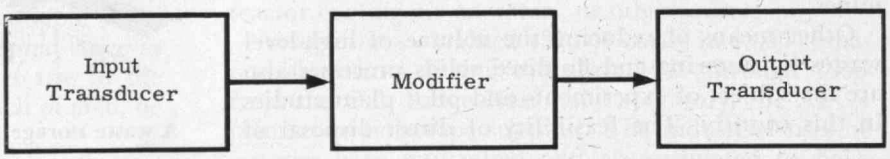
1) *Input Transducers* or sensing elements. These convert any physical quantity into an electrical signal (for example, a microphone, a strain gauge, a photoelectric cell).

2) *Modifiers.* These convert an electric signal into another, modified, electric signal (for example, an amplifier, a filter, an integrator).

3) *Output Transducers.* These convert an electric signal into a physical quantity that is not an electric signal (for example, a meter, a strobotron, a light valve).

By combining appropriate elements into a system, in accordance with the well-known rules and laws that govern the behavior of complex systems, the research worker has at his command a tool of almost unbelievable flexibility. What is more, the logical grouping shows clearly where the status of the art

(Continued on page 46)



Institute Yesteryears

25 Years Ago . . .

ANNOUNCEMENT was made in The Review for April, 1935, of the development by Athelstan F. Spilhaus, '33, a research assistant in the Division of Meteorology, of "an instrument which analyzes temperature and relative humidity and, in a single reading, indicates prevailing weather conditions in terms of personal comfort. . .

"The device, which is known as an air-mass indicator, combines a bimetal thermometer and a hair-hygrometer, which react to temperature and humidity to register atmospheric conditions in a single reading. The instrument is expected to be especially valuable in warning pilots of the dangerous conditions of temperature and humidity in which ice begins to form on airplane wings. . ."

Also, it "promises to be useful in indicating zones of comfort to be maintained in air-conditioned buildings. Comfort at comparatively low temperatures requires higher humidities than the corresponding degree of comfort at high temperatures. Thus with a high temperature the humidity should be low, while with a low temperature a high humidity is desirable. The reason for this is that at low humidities evaporation from the body is more rapid and the process produces a cooling effect. At low temperatures such a cooling effect is uncomfortable, and can be prevented by a higher humidity. . ."

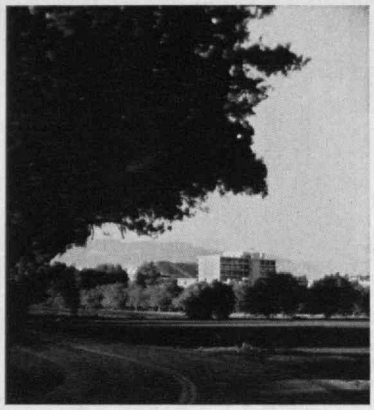
¶Kudos in the form of medals came to four Alumni, namely: to Henry E. Warren, '94, the Lamme of the American Institute of Electrical Engineers "for contributions to the development of electric clocks and means of controlling central station frequencies". . . to Frank B. Jewett, '03, the Faraday of the British Institution of Electrical Engineers . . . to Charles A. Kraus, '08, the Willard Gibbs of the American Chemical Society . . . and to Harold L. Hazen, '24, the Levy of the Franklin Institute.

50 Years Ago . . .

ON APRIL 28, 1910, at the 5th meeting of the Alumni Council, President Richard C. Maclaurin of the Institute, assured members of the Council that its reports and suggestions as to Institute policy were most welcome by the Executive Committee of the Corporation.

As reported by The Review, Dr. Maclaurin "acknowledged that the site problem is one of the greatest before the Executive Committee, and the Committee is working earnestly toward a solution. He believed the members of the Council would agree that it would be unwise and very unbusinesslike to make public the exact plans of the Executive Committee or to suggest what sites, if any, are being definitely

(*Concluded on page 40*)



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An electron device permits scientists to study the behavior of charged dust particles held in suspension.

Institute Yesteryears

(Concluded from page 38)

considered. He also asked the Council to realize how foolish it would be for the Institute to sell its present property [in Boston] at a figure which would be a tremendous sacrifice as compared with a possible income which could be received from the sale of the land in a few years, when the rights of the abutters would grow less or could be bought at a more reasonable figure."

75 Years Ago . . .

ON SATURDAY, April 11, 1885, the Freshman battalion gave an exhibition drill at the Soldiers' Home Carnival which, said *The Tech*, "seemed to be highly appreciated by the visitors. The young ladies attending the booths were especially struck by their appearance, and gave special rates to students.

"The elegant stand of colors, to be given to the most popular military organization in the state, was won by the Techs. The vote stood: Techs, 1,358; Post 5, G.A.R., 1,042. These flags will be carried in the future by all M.I.T. battalions."

¶As indicative of the lack of gracious living suffered in and about Copley Square by students, the editor invited attention to the problem of lunching.

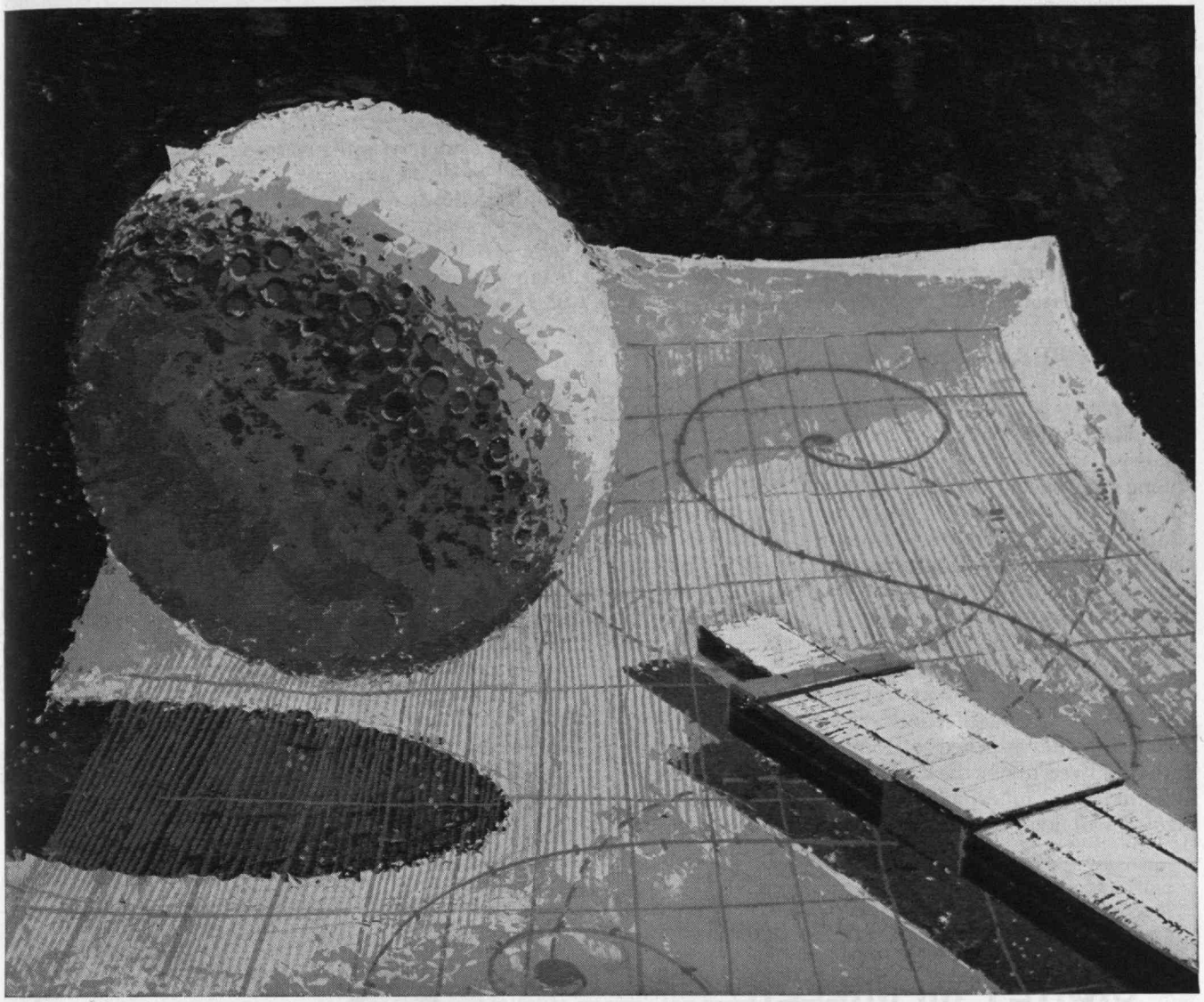
"Last year," he wrote, "a vague rumor was in circulation that a restaurant was to be established in the immediate vicinity of our buildings; it was soon disproved, however, and, as before, the weary Tech man trudged down town for his noonday meal. Nor is there any possibility of a good eating-house in this neighborhood; for, while the students of the Institute and adjacent schools would furnish a thriving business eight months of the year, very little support could be derived in the four months of summer from this neighborhood. . .

"A few years ago . . . the Catalogue used to announce that good board could be obtained at the Institute restaurant. The Faculty has apparently lost all interest in our convenience, since this statement is no longer made . . . It would seem as though the Faculty might offer a little assistance in this matter."*

99 Years Ago . . .

ON APRIL 10, 1861, the legislative Act of Incorporation (Chap. 183, Acts and Resolves of 1861) was signed by Governor John A. Andrew, whereby William Barton Rogers, and other members of his Committee of Twenty, and ". . . their associates and successors, [were] hereby made a body corporate, by the name of the Massachusetts Institute of Technology, for the purpose of instituting and maintaining a society of arts, a museum of arts, and a school of industrial science, and aiding generally, by suitable means, the advancement, development, and practical application of science in connection with arts, agriculture, manufactures, and commerce; . . ."

*The relationship between living conditions and student morale nowadays is considered in the article on page 22 this month.



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Books

EDMUND BURKE AND IRELAND, by Thomas H. D. Mahoney, Associate Professor of History at M.I.T.; Harvard University Press, $7.50. *Reviewed by Charles M. Gray, Assistant Professor of History.*

EDMUND BURKE is well remembered for championing conciliation with America and justice in India. He is perhaps best remembered for striking at the roots of the Revolution in France. His place in the history of conservative thought is as secure as his eminence among English orators. To Professor Mahoney's book we owe full awareness of a theme in Burke's career which has been much less well known. If Burke's concern for the amelioration of conditions in his native Ireland lacks the éclat of other themes, still it is the most persistently recurrent one. Without it the symphony would be different and less good.

The malady of Eighteenth Century Ireland was complex. Diagnoses and prescriptions could vary. To Burke, the center of infection was formed by the many legal disabilities attached to Roman Catholics. English Catholics lived under the same inheritance of pointless indignity, an inheritance to which contemporary bigotry still lent a sinister life. But in England the Catholics were a minority; in Ireland they were a nation. As a nation, they found no expression. Ireland was self-governing, though in a second-class way, for the sovereignty of her parliament was subject to supereminent powers of the British government. But in so far as she was self-governing, rule belonged to the small Protestant minority, essentially to the Anglo-Irish Landlords whose political ascendancy went hand in hand with economic exploitation. Burke's efforts were predominantly engaged in working for the emancipation of the Catholics and their incorporation into the country's political life. These efforts were not wholly fruitless, but Burke was rightly, disappointed at how far short of the requirements of justice and prudence the achievement fell.

Professor Mahoney has made it equally clear what Burke's approach to Ireland was not. In 1782, under pressures raised by the American war, Ireland achieved legislative independence. Burke's attitude toward this step was acquiescence rather than enthusiasm. Commercial discrimination was among Ireland's grievances, and early in his career Burke worked for improvement in this area, but he opposed a much more extensive liberation of Irish trade proposed by Pitt in 1785. Radical approaches – full Irish independence, union with Great Britain on the Scottish model, revolutionary methods, and Parliamentary reform – met no favor from Burke. To some, his championship of Ireland may seem so overlaid with caution and reservations as to lack any heroic quality. Despite his frank admiration for Burke, Professor Mahoney does not indulge

(*Continued on page 44*)

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(*Continued from page 42*)

his record on free trade and reform. It remains important to understand that Burke harmonized his feelings about Ireland into a delicately wrought pattern of political thought and vision. He saw the prospect of an "imperial" Britain in which Ireland would be included, in which the members would thrive without losing their subordination to the head, and in which the historic integrity of English institutions would not be violated. The complexity of his vision qualified what he could do for Ireland, but he never lost sight of what was most crucial.

Professor Mahoney has pursued his research with tireless care and presented his material clearly and judiciously. Because the book is extensively based on manuscript material only recently made available, it has a significance for the general study of Burke beyond the limits of the special subject.

ATOMIC ENERGY IN THE SOVIET UNION, by Arnold Kramish; Stanford University Press, $4.50. *Reviewed by Manson Benedict, '32, Professor of Nuclear Engineering.*

MR. KRAMISH's valuable book traces the development in Russia of nuclear physics and its practical applications from the early work of Kapitsa in the 1920's to the most recent Russian accomplishments in nuclear power stations and nuclear propulsion. The impressive number and variety of sources drawn on by the author include Russian newspapers and technical journals, information presented by Russian scientists and engineers at international conferences, disclosures by *émigrés* from Russia, and accounts of visitors to Russia as recent as those of Mr. Nixon and Admiral Rickover. Developments in Russia in such fields as atomic weapons, atomic power, particle accelerators and radioisotopes are contrasted and compared with developments in the United States.

A few examples will illustrate the interesting comparisons made by Mr. Kramish between atomic developments in Russia and in other countries. Although the principal discoveries in nuclear physics before the war are usually considered to have occurred in Germany, France, England, and the United States, Russian scientists also made important contributions, including the discovery of spontaneous fission. The war stopped all work in applied nuclear physics in Russia, whereas it accelerated it in the United States through creation of the Manhattan District. After Hiroshima, when the decision was made to produce atomic weapons in Russia, the development there proceeded as rapidly as it had in the United States. Recently, the Russians have been conducting experiments, with thousands of tons of conventional explosives in China; this may either presage large-scale peaceful utilization of atomic explosives to alter river beds or extract minerals, as proposed in the U.S. Project Plowshare, or it may be intended to screen clandestine tests of atomic weapons in the "vast geographical and political void of Red China."

(*Concluded on page 54*)

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The Elements of Instruments

(*Continued from page 36*)

is lacking, and where new invention is needed. All that is required is a handbook giving qualitative and quantitative information regarding existing elements.*

A Code for Instruments

Yet, there is more to it. The proposed organization permits the representation of any instrument in terms of the elements from which it is composed. If the elements are coded, the entire instrument can be expressed in a logical code system. For instance, the simple system illustrated on page 36 may be a vibration meter; the input transducer has a mechanical input (Group I_1) and is sensitive to displacements (I_{1C}). The modifier is an amplifier (M_{2B}), and the output transducer is a meter (O_{2A}) or a recorder (O_{3A}). Therefore, the entire system is described, in its generic form, by the code

$$I_{1C} \rightarrow M_{2B} \rightarrow O_{2A}.$$

Any system that has the same input and output but contains an unspecified modifier would be represented by

$$I_{1C} \rightarrow M \rightarrow O_{2A}.$$

The establishment of such a logical code system is of importance in all those cases where computer techniques are used. The greatest need for such techniques at present is in literature searching and information retrieval. Much has been written about the ever-increasing flood of scientific publications and the need for machine-handled searching. The situation is particularly serious in the study of instrumentation because contributions to the field come from sources as diversified as pure physics and aeronautical engineering, anesthesiology and steel production, enemy attack warning systems and respiration measurements in clinical medicine. There is some hope that the greater part of the literature search problem (or "information matching" problem, as it has been aptly called) in the field of instrumentation can be solved with the help of the code system mentioned above and a suitable abstract service.

A Rose by Another Name

Admittedly, the name "instrumentation" is not a product of Madison Avenue. It is misleading and it emphasizes a technical embodiment which is temporary, rather than the method which is permanent. The word "methodology" (coined, originally, by the philosopher Immanuel Kant) seems to be much more descriptive of the content of the described field. Other names have been proposed, too, such as instrumentology, metrology, and metronomy. Courses in this field that are given at German and Swiss uni-

(*Concluded on page 48*)

* The organization and compilation of such a handbook is one of the goals of our group at M.I.T. Vol. 1 of this handbook has been published (McGraw-Hill Book Co., Inc., New York, N.Y., 1959). The project is supported by the Office of Naval Research.

A Freshman and a Friend Make Radio News

AN M.I.T. FRESHMAN, Raphael Soifer, and a friend possibly were the first radio hams to use an artificial satellite, when they exchanged coded signals February 6 between New York City and Bethesda, Md. Two satellites were nearby, and Soifer believes the signals were reradiated by a satellite's antenna or bounced off an ionized trail behind it. He plans more tests this spring.

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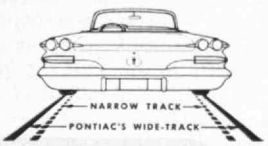

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The Elements of Instruments

(*Concluded from page 46*)

versities bear the title *Physikalische Messkunde,* a name which defies translation.

There are other considerations. There already is quite a literature under the name of instrumentation. There is a *Review of Scientific Instruments* and a *Journal of Scientific Instruments,* and in the light of the accepted nomenclature it seems rather futile to advocate a new name for a field of science, even if it would be more descriptive of the content.

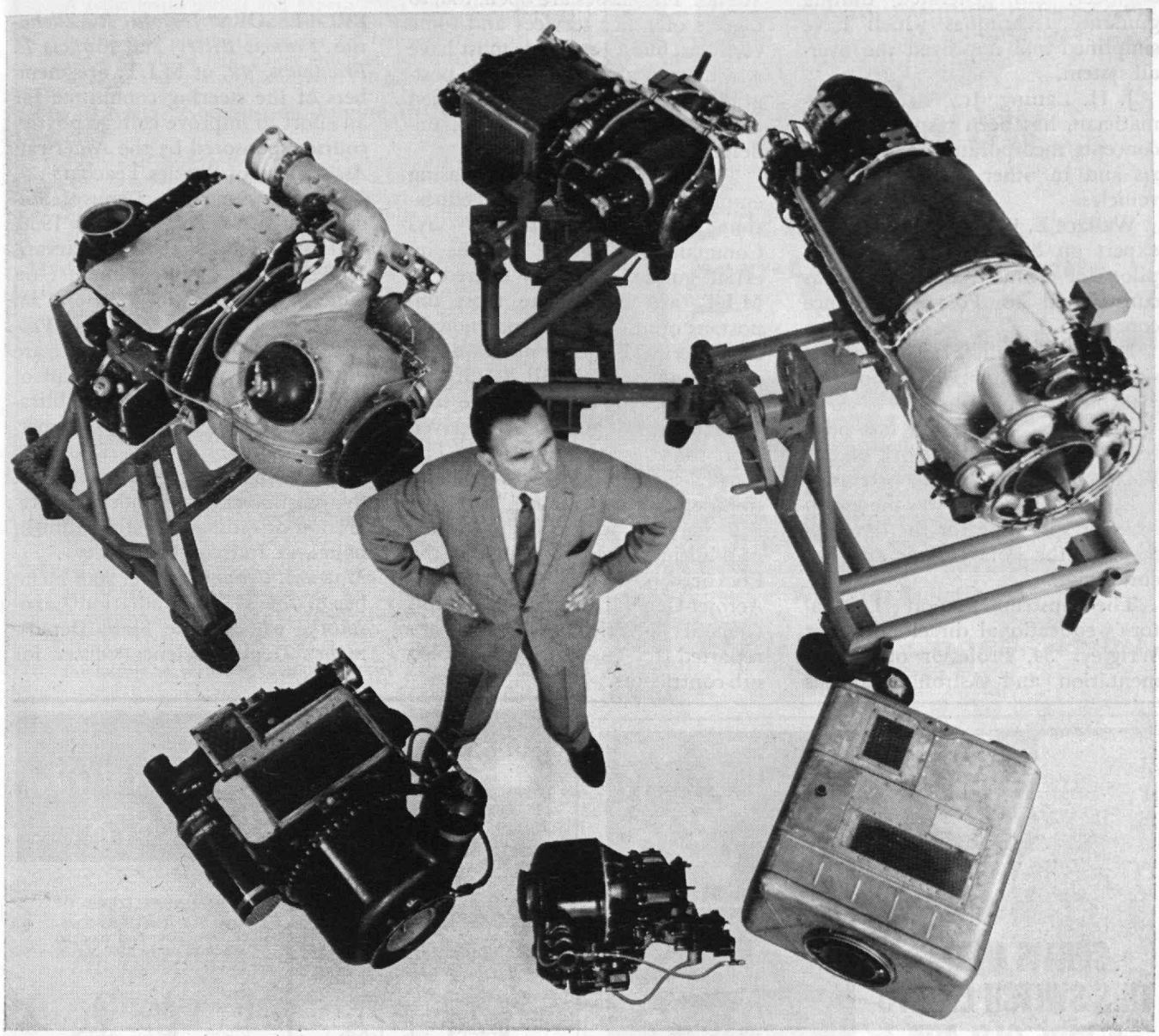
An Educational Opportunity

Teaching instrumentation can be a considerable challenge. The field has all the characteristics required of a science: it is simple in its structure, logical, and aesthetically acceptable. Presented in a proper way, it stimulates creativity as an academic subject should. The wide spread of instrumentation furnishes examples of great variety, from fields as different as musicology (harmonic analysis methods) and astronomy (noise suppression in photomultipliers).

Education in Instrumentation is primarily of value because it gives one a deeper insight into physical processes and because the concept of instrumentation elements is a great aid in thinking, even in fields outside of the scope of physics. In fact, the language of modern biology, anthropology, and social science has adopted many idioms which originally were reserved for instrumentation elements.

Finally, we should not apologize for the fact that knowledge of instrumentation is of considerable practical value to nearly every scientist and engineer. Many of the modern demands of the pure physical sciences, the engineering sciences, biology, medicine, psychology, and others, be they on the academic or industrial level, require more than chance familiarity with the field of instrumentation. It is not surprising, therefore, that many institutions and departments offer formal courses in instrumentation, and it is to be expected that a general Instrumentation course on a broad basis will emerge in the near future.

Auxiliary Gas Turbines becoming a prime power source for industry



Helmut Schelp, chief engineer, AiResearch Manufacturing Division of Arizona, Phoenix, surrounded by typical gas turbines now in production ranging in size from 30 to 850 hp. Clockwise from the top: GTC 85-28 GTCP 105 · GTP 70-6 · GTP 30-1 · GTP 70-10 · GTU 85-2.

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Story Behind Polaris

(*Concluded from page 24*)

engineer, has generated unique guidance techniques which have simplified and improved the overall system.

J. H. Laning, Jr., '40, a mathematician, has been responsible for concepts incorporated in the Polaris and in other missiles and air vehicles.

Wallace E. Vander Velde, '56, an expert on high-performance autopilots for military aircraft, also has contributed to Polaris guidance concepts.

Edward J. Hall, '57, works on design of components of almost incredible sensitivity.

John B. Nugent, '37, has been responsible for design work on the Polaris and other missile systems.

Eldon C. Hall, '53, was the group leader responsible for the development of the Polaris logic and circuit design.

The Instrumentation Laboratory's educational director, Walter Wrigley, '34, Professor of Instrumentation and Astronautics, has worked with Dr. Draper since the early days and now has responsibility for devising curricula for M.I.T. classes which qualified Naval officers attend. The classes are open, too, to officers of other services and some civilians, but all students must have a security clearance for certain postgraduate courses. Unclassified courses are offered for M.I.T. undergraduates.

"The Navy is placing increasing emphasis on postgraduate education in scientific subjects," says Commander Padgett, "and the inertial guidance courses offered at M.I.T. are among the most important of all. Many officers now in the Special Projects program, especially those who will be directly concerned with either surface ship or submarine guidance, received their training at the Institute. The courses are rigorous and demand complete concentration."

Prime contractors for the Polaris, in addition to M.I.T., include the Lockheed Aircraft Corporation, Aerojet-General Corporation, and General Electric, and there are reported to be more than 3,000 sub-contractors.

Individuals Noteworthy

(*Concluded from page 12*)

Names in the News

PROFESSORS *Jerrold R. Zacharias, Francis Bitter,* and *Francis L. Friedman, '49,* of M.I.T. are members of the steering committee for an effort to improve college physics courses sponsored by the American Association of Physics Teachers . . . *E. Francis Bowditch,* Dean of Students at M.I.T. from 1951 to 1956, will be Chief Marshal at Harvard University's commencement on June 16 . . . *James R. Aronson, '58,* and *John S. Waugh,* Associate Professor of Chemistry at M.I.T., are on the Russian translation staff of *Optics and Spectroscopy,* a publication of the Optical Society of America . . . *William E. Rogers, Jr., '50,* is one of the directors of a study of the possible effect of fluoride on retention of radioactive strontium in bones, at Indiana University . . . *Marshall Crouch,* former staff member of the M.I.T. Radiation Laboratory, will be the State Department's Deputy Science Officer for Tokyo.

The Lady Is a Phony

(*Concluded from page 28*)

wasn't really necessary to look into the core of matter any farther.

Titanium was first used in paint in 1916, and has only been found in the pigments of portraits made since 1920. Chromium has been used longer, and chromium oxide might be found in a painting made as long ago as 1862. These and other such dates are matters of record, verifiable in numerous ways. Neither titanium nor chromium would have been in this masterpiece if it had been the work of a Fifteenth Century Florentine artist. It was clearly a forgery, and a recent one.

Suppose, however, that the forger had not covered the original picture below the lady's portrait in this way. He might, instead, have tried to enhance the value of a Fifteenth Century picture simply by putting a famous artist's signature on it. This is an old and less exacting kind of deception. But in this case the needle could have been inserted into the signature. Then the pigments of the paint used for the signature could have been compared, in the electron microbeam probe, with those in the painting beneath it.

Nature's masquerades often are more effective than those devised by men's cupidity, and some of these are being explained with this instrument at M.I.T. Its uses in determining the homogeneity of glass, ceramics, and other combinations of elements – and similar mysteries regarding materials to which men entrust their very lives – will be emphasized in the course which Professor John T. Norton, Professor Ogilvie, and others will give this summer.

There may be but few students of art and history in their classroom. Nevertheless, Mr. Young welcomes this move to show the probe's achievements, limitations, and potentialities to more scientists. Few museums are as well manned and equipped as Boston's to scrutinize art scientifically, and its laboratory is fully three years behind in its work. When more schools and industrial laboratories can lend a hand the way that M.I.T. has to the world of art, Mr. Young feels certain, there will be fewer phony Fifteenth Century ladies adrift.

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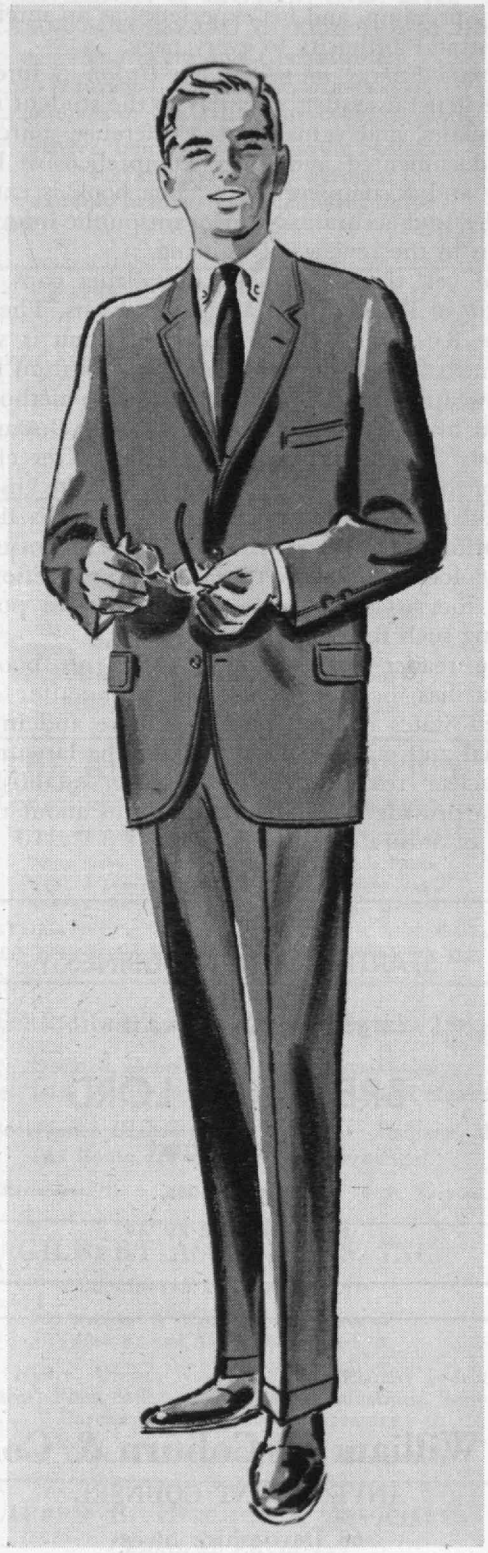

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Books

(Concluded from page 44)

Mr. Kramish has brought an unusually appropriate combination of talents to the preparation of his book. His education as a physicist, his facility with the Russian language, his familiarity with the U.S. atomic energy program, and his experience as an intelligence analyst add authority to every page.

Atomic Energy in the Soviet Union is interesting to the general reader, essential to the student of Russian affairs, and valuable as a reference source. It is well documented and has a comprehensive bibliography and a complete index. The book is extremely detailed and accurate. No relevant public information known to the reviewer is missing.

And yet, there are many tantalizing gaps in this account of Russian nuclear developments. The record of the Russian atomic weapons program is sketchy, with next to nothing told about the location of Russian weapon centers, the production methods employed, the men responsible for the development, or its costs. This lack, of course, testifies to the effectiveness of the Russian security system and the absence of a Russian Smyth report. Similarly, there is little information given on Russian uranium deposits, their nature, location, reserve tonnages, or production rates. This, too, is attributable to the Russian policy of holding such information secret.

The reader will conclude from this book that Russia has been a formidable competitor of the United States in pure nuclear science and in its industrial and military applications. The large number of nuclear research centers recently established in Russia provide no complacency for us about the outcome of future competition.

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Club Notes

The Barbours Are Guests Of Association of Japan

On Thursday, January 21, 1960, the M.I.T. Association of Japan held a dinner meeting in honor of William E. Barbour'33 and Mrs. Barbour who were in Tokyo as part of their Far Eastern tour. Twenty-two members attended, which on short notice was a good turnout. After dinner Mr. Barbour was invited to give a brief outline on the changes at M.I.T. in recent years — many members have not been in the United States since graduation before the war. There was considerable interest in the geographical and industrial developments on Route 128 with its M.I.T. oriented technical companies.

Following Mr. Barbour's comments, we went around the table with each member present describing his activities since graduation. The Barbours have been good friends of the Krims since the early 1930's. Inasmuch as we all liked Norman Krim'34, who was here a few weeks ago, we were very glad to maintain the train of memories of our Alumni. — SHIKAO IKEHARA'28, *President,* 22-1 Shimizucho, Meguro-Ku, Tokyo, Japan.

Southern California Club Elects 1960 Officers

The M.I.T. Club of Southern California held its annual dinner meeting on January 19, 1960, at the University Club in Los Angeles. Guest speaker was Admiral Jack P. Monroe, Commander of the Pacific missile range, who spoke about "Missiles over the Pacific."

Nominations and elections for the year 1960 took place with the following results: President, Richard S. DeWolfe'36; Vice-presidents, Raymond B. Stringfield'15 and Robert M. Copsey'44; Treasurer, T. Gary Loomis'44; Secretary, Albert A. Levingston'49; Assistant Treasurer, Donald G. Gilbertson'53; Assistant Secretary, Louis Young'50; Governor as immediate past president, Robert Welles'15; Governors at large, James S. Cullison'41, William H. MacCallum'24, Anthony Thormin'27 and James T. Holmes'14; Governors for classes: before 1925, Hiram E. Beebe'10; 1925–1929, George M. Cunningham'27; 1930–1934, Page E. Golsan, Jr.'34, 1935–1939, Robbins H. Ritter'37; 1940–1944, Ray O. Wyland'42; 1945–1949, Richard J. Steele'46; 1950–1954, Joseph W. Marshall'53; and 1955–1959, Howard D. Phillips'57.

The Alumni attending the meeting were: R. L. Alder'37, J. W. Barriger'49, P. K. Bates'24, M. Beilock'49, H. B. Boreham'47, C. L. Cataldi'50, B. S. Coleman'19, R. N. Creek'47, J. S. Cullison'41, G. M. Cunningham'27, R. S. Dewolfe'36, J. F. Downing '46, F. J. Elser'31, M. L. Foster'51, D. G. Gilbertson'53, B. A. Gillies'27, K. C. Grant '02, P. T. Gross'54, A. R. Gruber'46, E. T. Heitschmidt'22, R. W. Hunn'28, G. E. Inshaw'51;

The M.I.T. Club of Schenectady held its annual dinner meeting on January 29, 1960, at the Mohawk Country Club. During the meeting the club presented to Gordon Brown'31, Dean of Engineering at M.I.T., a contribution of $500 for the M.I.T. Alumni Fund. Following the short presentation ceremony, Dean Brown spoke about "The Impact of Foundation Grants on Engineering Education." Chatting at the dinner were, from left to right: Elbert H. Bancker'18, Program Chairman; Dean Brown, and John H. Helve'44, President.

Also A. A. Levingston'49, T. G. Loomis '44, R. E. Lunn'38, A. A. Markus'44, J. W. Marshall'53, R. I. Mela'47, B. F Miller'28, R. M. Nelson'30, S. Osborne'26, A. D. Phelps'26, W. D. Putt'59, J. W. Reis'19, R. S. Robinson'32, D. D. Rodger'48, A. J. Romano'50, D. I. Sinizer'51, C. Skladal'44, O. K. Smith'40, V. Stanley'44, R. B. Stringfield'15, C. W. Turk'56, A. F. Wagner'38, C. E. Wagner'37, C. J. Wang'46, R. Welles '15, R. O. Wyland'42 and L. Young'50 — ALBERT A. LEVINGSTON'49, *Secretary,* 3850 Wilshire Boulevard, Los Angeles 5, Calif.; LOUIS YOUNG'50, *Assistant Secretary,* 2234 South Spaulding Avenue, Los Angeles 16, Calif.

Fairfield Club Hears Cook at the Clam Box

As the second of three events planned for the 1959–1960 season, the M.I.T. Club of Fairfield County held a very successful dinner meeting at the Clam Box in Westport, Conn., on Thursday, February 4. We had an unusually large group of 66 members and guests. The meeting was held during the mid-year recess period so that students from the club area could be invited. The speaker for the occasion was sound engineer Emory Cook'34, founder and president of Cook Laboratories in Stamford, who is noted especially for the novel high fidelity recordings he has produced under the label "Sounds of Our Times." Mr. Cook discussed some of the functional aspects of various sounds with special reference to exploratory work underway on little known psychological effects. Special test records along with questionnaires were distributed to about 40 of the group who were invited to report their reactions to the recorded sound.

We were very happy to welcome the following students, three of whom were accompanied by their dads: David Bond '62, Bion Francis '60, David Gardner '63, Homer Knearl '62, John McDonald '63, Leland Perry '63, Albert Plate '62 and Pat Shea '61.

Among the Alumni who attended were: Rex Beisel, Jr.'42, Richard Berger'16, George Bott'46, Albert Bowen'48, George Bradley'52, Fred Brooks'55, Bart Chapman '35, Jack Coyle'20, Philip Covitt'14, Gene Davis'55, Harry Dedell'47, Marc Dreyfus'50, Howard J. Duge'22, Fred Ferrary'37, Jerry Franks'29, Robert Gaines'39, Randall Goff '51, Les Gordon'55, Paul Grady'51, Howard Harding'52, Elmer Harmon'30, Stu Harris '40, Tom Henry'57, Richard T. Kasal'53, Vello Kampman'51, Michael Kundrath'31, Richard Lobban'32, Lewis Lucas'26, Charles Lucke'34, Dave McCandless'51, Harry McCue'52, Dave McGrath'26, Anthony Savina '30, Philo Shelton'18, Harvey Sherman'55, Warren Smith'50, Joseph Sousa'37, Sam Spiker'25, Clint Springer'45, Harold Tepper'52, Don Waterman'39, Dick Webb'48, J. Richard Vyce'52, Art Weinberger'41, Charles Wesley'34, Abe Zimmer'39 and Danilo Zucoli'58.

Coming up in May is a joint meeting with the New Haven and Hartford Clubs with Dr. Julius A. Stratton'23 as guest speaker. This promises to be an outstanding event. Details will be in the mail soon if you have not already received them. It is urged that reservations be made early. Get in touch with the secretary, Elmer Crouthers, 152 Norman Circle, Stratford, or with any of the other officers: Anthony Savina, President, 79 Ledge Lane, Stamford; Donald Waterman, Vice-president, 99 Flat Rock Road, Easton; and C. Philip Epifano, Treasurer, 477 Barlow Road, Fairfield.

The writer is pinch hitting for the secretary who was unable to be at our February meeting due to illness. — ANTHONY R. SAVINA'30, *President,* 79 Ledge Lane, Stamford, Conn.

Philadelphia Club Honors Past Presidents

Our meeting on January 26 at the Barclay Hotel, which was arranged by Bill Bertolet'48, was a sparkling success. One hundred and twenty turned out to do honor to our past presidents. Following the usual social hour, we adjourned to the ballroom where we partook of the fine cuisine. After the dinner, Ed Healy'23, president during 1943 and 1944, reminisced about some of the history of the club, reviewing the time when the Alumni were not quite as active as they are today. He recalled the unselfish contributions of many, such as George Whitwell, Phil Alden, George Logan, Granger Schrader, Frank Chesterman, Jim McGowan, Wink Quarles, Walter Beadle, Bob Hershey, Grev Haslam, Andy Anderson, and many others who have made the club what it is today. The past presidents that were with us for the evening were: Percy Tillson'06, who came from Harrisburg, Dick Pough'26, who arrived from Pelham, N. Y., Jerome Harrison'06, Bob Weeks'13, René Pouchain '17, Ed Healy'23, Dick Jones'26, George Logan'29, Frank Chaplin'32, and Sam McCauley'41. We were sorry to hear of Andy Anderson's recent illness and everyone wishes him a speedy recovery.

The next event on the agenda, following reports by the treasurer and secretary, was the annual election. Sam McCauley'41 reported for the nominating committee a slate which was unanimously voted into office. Except for the executive committee, the officers remained the same: Kenneth S. Lord'26, President, William H. Bertolet, 3rd,'48, First Vice-president, Wiley F. Corl, Jr.'39, Second Vice-president, Charles W. Hargens, 3rd'41, Third Vice-president, Herbert R. Moody'41, Secretary, Enno T. Sauer'37, Assistant Secretary, Robert G. Fisher'44, Assistant Secretary, Lee C. Eagleton'44, Treasurer, and Joseph T. Lester, Jr.'44, Assistant Treasurer, with Vahram G. Miskjian'29, C. Leslie Grahn'34, James W. Libby'35, Spencer A. Schilling'44, Donald A. Dean'47, George W. Smith'54 and Thomas V. Griffiths'57 as members of the executive committee.

The main event of the evening was an address by Professor Norman J. Padelford who brought us up to date on recent developments at M.I.T. and then gave an excellent speech on "A Time to Reappraise the Foreign Goals in World Affairs." He warned against complacency resulting from the current apparent reduction in world tension. Much interest was evidenced by a lively discussion following the meeting.

The next event of the club will be a dinner-dance at the Llanarch Country Club on May 27. — HERBERT R. MOODY'41, *Secretary*, 3010 Tower Road, Huntingdon Valley, Pa.

Large Miami Valley Turnout Hears D. Hugh Darden

There was an exceptionally fine turnout for the second meeting of the M.I.T. Club of the Miami Valley held Tuesday, January 26, in the Mahogany Room at the Van Cleve Hotel. In addition to 21 members, we had as guests two high school faculty advisers, six high school seniors interested in M.I.T., and the father of one of the boys. D. Hugh Darden, Executive Secretary of the Educational Council was our honored guest and speaker.

The theme of Hugh's talk was to compare and contrast M.I.T. of today with M.I.T. as most of those present remembered it. The liveliness of the discussion period and the reluctance of the group to leave after the meeting was officially closed were ample proof of the high degree of interest generated by his remarks. Prior to the talk there was a brief business session at which William D. Walther'50, was elected secretary-treasurer, to serve the unexpired term of William L. R. Rice'53 who has moved away from the area.

As announced previously, plans are in the making for a meeting of the Miami Valley group at Wright-Patterson Air Force Base. Details will be released later in the usual manner. The fourth and final meeting will be the annual picnic in Hills and Dales park in June. This is a co-educational function that always has been well attended and thoroughly enjoyed. — CHARLES M. BILLMAN'25, *President*, Winters National Bank and Trust Company, Dayton, Ohio.

Lehigh Valley Hears Dr. W. W. Rostow

The winter meeting of the M.I.T. Club of the Lehigh Valley was held on Thursday, January 21, 1960, at the Bethlehem Club. Ninety-three persons attended, including members and their wives, and 22 prospective M.I.T. students and 5 high school advisers, who were our guests. After a fine dinner, a brief meeting was held and then the guests were asked to rise and identify themselves. Jack Smyser'35, our president, welcomed them and pointed out the recognized need in recent years for greater emphasis on the study of the humanities and social sciences in engineering schools. At M.I.T., this trend has been moving along rapidly and as part of the program, the Center for International Studies was organized. Dr. W. W. Rostow, the speaker of the evening, is professor of economic history in the school and is a recognized expert in this field.

Dr. Rostow gave a brief talk for the benefit of the prospective students, pointing out that M.I.T. now has an excellent group of top flight men in the humanities and social sciences. He indicated that M.I.T. is developing into a university, differing, however, from the traditional type in that emphasis has been shifted from liberal arts to the social sciences, economics, and humanities.

We all walked around the corner to the Young Women's Christian Association building where a joint meeting was held with the Foreign Policy Association of the Lehigh Valley. This was the "kick-off" meeting of that organization with Dr. Rostow as the speaker on the subject "What Chances for India's Middle Way." Jack Smyser introduced Dr. Rostow, whose address was thought provoking and appreciated by all. He was very generous in answering questions from the floor, which finally had to be brought to a halt to permit Dr. Rostow to return to Cambridge early in the morning. — J. T. ACKER'24, *Secretary*, 154 West Langhorne Avenue, Bethlehem, Pa.

Hartford Club Members Discuss Spring Plans

Several members of the M.I.T. Club of Hartford met at the home of club president Ed Kane'47, on February 2, to make final arrangements for the dinner meeting which was to be held on February 16, featuring Professor Columbus O'D. Iselin of the Woods Hole Oceanographic Institution. Professor Iselin was to speak on "Modern Oceanography and Marine Resources." In attendance were: Bill Boysen'48, Tom Malone'46, Marshall McGuire'42, Frank Seeley '42, Al Shulman'37, Lester Smith'50, Joe Kozol'54, and from the New Haven County M.I.T. Club, President John Lynch'52 and Vice-president John Kaymen'48.

Plans were also made for a combined meeting with the New Haven and Fairfield clubs in mid-May, at which Dr. Stratton will speak. A large turnout of Alumni from the southern Connecticut area is expected. A joint committee will be established to plan a picnic for Alumni of the Hartford and New Haven clubs this summer. — JOE KOZOL'54, *Assistant Secretary*, 7 Norfolk Street, Hartford, Conn.

M.I.T. Club of Hong Kong Welcomes the Barbours

William E. Barbour'33 and Mrs. Barbour were guests of the M.I.T. Club of Hong Kong on January 12. The Barbours were on a trip around the world and were visiting several Far Eastern cities on the way. Twelve club members and our two guests had a sumptuous feast of Chinese dishes and drinks at the Café de Chine.

Mr. Barbour is the former president of Tracerlab, Inc., and is a member of the Alumni Council. Therefore, he was able to bring us up to date on the changes and activities currently occurring in Cambridge.

This is a good occasion to say that G. Y. Fong'15 is the retiring president of the M.I.T. Club of Hong Kong. He served in this capacity for many years. His successor is Alfred C. Louie'38, and the new secretary-treasurer is Yuk P. Poon'37. Mr. Poon has done an excellent job already in providing an up-to-the-minute directory of the active club members along with their addresses, business affiliations, and so forth. — G. Y. FONG'15, *Past President*.

Western Pennsylvania Holds Guidance Counselor Night

January 25, 1960, was our annual guidance counselor night with D. Hugh Darden, Executive Secretary, of the Educational Council as our principal speaker. It was held as usual at the University Club in the Oakland district of Pittsburgh. Fifteen counselors from local schools, 8 members of the area council, headed by Chairman Henry Avery'41, and 18 members attended.

Our next meeting will be on February 22 when we will have Edward J. Hanley'24, President of the Alumni Association and a member of our club, as the speaker. President A. A. Archibald'28 would like to hear from any new Alumnus in the area and have him join us. Data on meetings and reservations can be obtained by calling — STUART D. MILLER'32, *Secretary*, 245 Park Entrance Drive, Pittsburgh, 28, Pa., Locust 1-4259.

Milwaukee Club Views Dr. Dietz's Russian Slides

The M.I.T. Club of Milwaukee had a very successful Christmas luncheon for M.I.T. students home for the holidays. Dr. Joe Shea from the missile guidance division of A. C. Spark Plug Company outlined the job opportunities available in this area for engineers. The subject of the talk was started at a previous luncheon meeting when this question came up: "How many M.I.T. graduates who live in Wisconsin return here to work?"

Alumni and students present included: Elton Staples and his three sons, Sam, Jim, and Charlie; Tom Duke, Bob Colton, Michael Alexander, Bob Gillmeister, Jesse Wallace, John Colby, Chester Meyer, Bill Schield, Emerson Van Patten, Noel Miller, Charlie Sollenberger, Bob Soli, George Pollock, Arthur Hall, Frank Breiber, and John Koch.

On February 3, Albert Dietz'32, Professor of Civil Engineering at M.I.T. showed 30 Alumni and their wives his beautiful 3-D photographs of his trip to Russia.

The M.I.T. Club of Milwaukee has a luncheon scheduled the second Tuesday of each month at the University Club. If you happen to be in Milwaukee at that time, you are cordially invited to join us. If you can't call Charlie Sollenberger at SP 4-3600, meet us at the Club at noon. — JOHN J. KOCH'53, *Secretary*, 1838 Rocky Point, Pewaukee, Wis.

Central Ohio Club Host To D. Hugh Darden

A most pleasant and informative dinner meeting was held the evening of January 27 at the University Club in Columbus. The guest speaker was D. Hugh Darden, Executive Secretary of the Educational Council of M.I.T. Mr. Darden delivered an interesting and thought provoking message concerning some of the present and future changes in the concepts and philosophy of scientific teaching.

Also present as guests of the Alumni and their wives were Mr. and Mrs. Fleckner, Mr. and Mrs. Welch, and Mr. Gimre, who have sons presently attending the Institute. Many of the Alumni had met these young men at a luncheon in December, and it was therefore even more enjoyable to visit with their parents.

Alumni and wives who attended the meeting include: Mr. and Mrs. John H. Butler'29, Mr. and Mrs. G. Albro Hall'27, Mr. and Mrs. William A. Horton'42, Mr. and Mrs. William E. Kellam'49, Colonel and Mrs. Robert R. Litehiser'19, Mr. George W. McClary'51, Mr. and Mrs. Bruce M. McDill'18, and Dr. and Mrs. Merrill A. Youtz'21. — WILLIAM A. HORTON '42, *Secretary*, 215 North Front Street, Columbus, Ohio.

Washington Club Dames To Hold April Meeting

William R. Ahrendt'41, formerly president of Ahrendt Instrument Company and vice-president of Litton Industries, was selected by the executive committee of the M.I.T. Club of Washington to be a candidate from district six for election to the national nominating committee of the M.I.T. Alumni Association.

On April 6 there will be a meeting of the M.I.T. Dames of Washington at 10:30 in the morning for coffee. We hope that as many wives as possible will attend this meeting to be held at St. Alban's School on Wisconsin Avenue.

Plans are under way for the next dinner meeting to be held on May 13 at the Cosmos Club to which all members and their wives are cordially invited. In addition to the annual election of officers to be held after the dinner, the arrangement committee promises an interesting speaker. — JOHN G. BEEBE-CENTER, JR.'56, *Secretary*, 3516 Lowell St., Washington, D.C.

Deceased

LEONARD M. DEMERITT'97, July 1, 1959*
MISS HELEN E. KEEP'97, November 8, 1959*
CARDELLA D. BROWN'99, November 24, 1959*
FRANK E. HERMANNS'99, October 22, 1959*
BASSETT JONES'99, January 23, 1960
MISS ROSE S. NICHOLS'99, January 27, 1960
FRANK A. SMITH'01, January 15, 1959*
ARTHUR P. HALL'02, January 18, 1960*
JOHN S. LOUGHLIN'05, January, 1960*
JAMES B. WHITMORE'05, December 15, 1959*
FRED J. WILKIEMEYER'05, August 27, 1959*
HAROLD C. ELLIOTT'06, December 9, 1959*
LAWRENCE E. STONE'06, February 8, 1960*
ROBERT C. ANGELL'08, November 27, 1959*
GORDON R. FULTON'10, April 16, 1959*
HARRY F. THOMSON'10, November 7, 1959*
LAWRENCE B. WEEKS'11, November 24, 1959*
CHARLES E. O. BICKERDIKE'12, January 1, 1960*
LEWIS DAVIS'12, February 7, 1959*
EMORY M. MARSHALL'12, June 23, 1959*
DAVID F. BAKER'13, September 28, 1959
DANIEL M. MOORE'13, April 14, 1959*
H. R. WEMPLE'13, December 27, 1959*
CHARLES B. HULL'14, January 22, 1960*
ERNEST L. O. PATTEN'14, February 8, 1960*
GEORGE O. EATON'15, November 24, 1959*
J. EDMUND DOHERTY'17, January 8, 1960*
PAUL N. MONTAGUE'17, November, 1959*
OTTO C. LORENZ'18, January 25, 1960*
HERBERT B. WHEELER'18, January 14, 1960*
LAURENCE M. DALTON'19, January 24, 1960
ROBERT M. LITTLEFIELD'15, January 17, 1960*
WILLIAM M. PERRY'22, September 28, 1959*
OTHNEIL G. WILLIAMS'22, January 18, 1960*
FRANK O'NEIL'24, February 6, 1960*
WILLIAM H. ROBINSON'24 February 5, 1960*
GLEN L. BATEMAN'25, January, 1960*
CLARENCE B. LOBER'25, December 18, 1959*
FRANKLIN E. WASHBURN'26, January 10, 1960*
B. M. PUTICH'28, June, 1959*
ROBERT A. MARR, JR.'29, December 20, 1959*
FRANCIS J. POWERS'29, December 20, 1959*
MAX G. NOHL'33, February 6, 1960*
RAY H. HOLLOWAY'50, January 6, 1960*
JOHN S. GAM'54, December 20, 1959

*Further information in class notes.

Class Notes

'91

The letter quoted in this month's notes from Charles Urban, our gifted classmate from Cincinnati, Ohio, vividly presents some aspects of student life in M.I.T. during the 1880's. Boxing was then widely practiced as a diversion from study. The late Henry Bradlee, an executive of Stone and Webster for a long time, once told me he and other Tech boys would foregather in the basement of Rogers Building where one of the Du Pont brothers would give them practice in "the art." That was a factor of student life in the eighties. I propose we put down in this column in the May issue a glimpse of the life and activities of the '91 Tech student of the 1960's.

Charles Urban wrote: "While at M.I.T. I joined the Boston Y.M.C.A. which was a short distance from the old Tech building. A group of us were fond of boxing and as we were not permitted to indulge in that sport on the Y.M.C.A. gymnasium floor, we held our bouts in the engine room in the basement. One afternoon Fred F. Moore, now deceased, I believe, and I engaged in a match. I drew a little claret from his proboscis and won the bout. Then, as I was strutting around with my chest inflated about twice its size, I was approached by a chap whom I didn't know and who invited me to spar with him. He was quite a large fellow, but being flushed with success, I accepted. Well, what he did to me was considerably more than what I had done to Moore. He knocked me over a coal pile and into the land of nod. I finally came around and suffered no ill effects.

"On another occasion on a Sunday morning, I gathered a bundle of papers and ensconced myself in one of the very comfortable chairs in the Y.M.C.A. reading room. I had been there but a few minutes when an attendant approached and very politely said 'Pardon me, sir, but the members are expected to attend services on Sunday.' Of course, I made an exit *eo instante*.

"You will recall how the students used to 'collect' signs and hang them in their rooms. I was out one night 'collecting' and noticed a particularly attractive sign. I walked up some brownstone steps, quietly detached the sign from its moorings, and tucked it under my coat. Just as I turned I noticed a 'bobbie' coming towards me. Attempting to be nonchalant, I stuck my hands in my pockets. That loosened the coat and down clattered the sign. I was a fair 100-yard-dash man, but believe me I dashed a record at the time with the bobbie after me. I had little trouble in evading him, but the experience caused me to give deep thought to future sign collecting.

"Now there is a moral to all of this: never become conceited, go to church, and don't

believe in signs. As for our reunion this June, I'm afraid that I shall not be able to make it much as I would like to. Best regards to all." — WILLIAM CHANNING BROWN, *Secretary*, 15 Forest Avenue, Hastings-on-Hudson, N.Y.

'94

It is rather difficult to produce each month a batch of interesting notes about the activities of classmates now that our numbers are so greatly reduced, and this in part at least, is the reason why there were no notes in the last issue. The secretary hopes to do better in the future and earnestly requests the co-operation of all who were at any time associated with the Class; especially those who went through the four years at M.I.T. Even in the days when we are all retired, or practically so, there are events and happenings that would be of interest to all the survivors.

Through the exchange of Christmas greetings it is known that Abbot is still busy, Crary is on the job as usual, and Sherman is carrying on with the sale of machinery. . . . Having seen Nowell at his home in October, the secretary has been happy to receive two long-distance calls from him since that time. He was also pleased to receive recently a clipping from a Reading, Pa., paper describing the first direct-distance dialing from that city to the West Coast. The persons involved were the oldest Bell employee (retired) in central Pennsylvania as the one making the call and Jack in his home at Hillsborough as the recipient. Mr. Walter Bush, the Reading man, is also reported to have made the first call from that city to San Francisco in 1915, but Jack is not identified as the recipient this time. Nowell played a very important part in the development of long-distance telephony, both in Philadelphia in the early years, and later when he became general manager and eventually vice-president of the whole Pacific division of the Telephone Company, until his retirement 25 years ago. So he has long been a member of the telephone pioneers. Early in his career with the Telephone Company he nearly lost his sight by being drenched with battery fluid, but by prompt action his sight was saved. He reports that he has just come from the oculist who found only a slight change in his bifocals to be needed, which means he can still drive his Vauxhall. He is to be congratulated. It is pleasant to report that his wife, who has had operations for cataracts on both eyes, is rapidly improving in vision.

A letter from Mrs. Henry E. Warren brings the news that she is preparing a biography of Harry. She also sent a small color print of a portrait of him painted by William Cushing Loring, a well-known artist who was a cousin of Harry. The secretary regards the portrait as excellent, and it is hoped that the portrait will come to M.I.T. It may be that members of the Class who remember Harry's splendid participation in our class reunions, when he photographed the group and otherwise added to our pleasure, would like to have a print of the portrait. If so, Mrs. Warren will be glad to supply it, and the secretary will be glad to act as agent if so requested.

Mrs. Warren also sent a copy of the citation given to her husband at Rutgers University in June, 1950, when he was awarded an honorary degree of Doctor of Science. With Harry's characteristic modesty he never reported the honorary award. Therefore, this is the first opportunity the secretary has had to inform the Class of this well deserved recognition of his great inventive ability and gift of management. The first part of the citation is quoted here, as it characterizes well our distinguished and beloved classmate: "As an engineer whose inventive genius has been documented through the granting of scores of patents by our own and by foreign governments; as the inventor of the synchronous electric clock making possible the interconnection of vast electric power systems; as an industrialist whose initiative and organizational skill have created a great and thriving industry; as a humanitarian whose influence for good has been felt in many fields; you enter today the honorary fellowship of the university with the grateful appreciation of your friends and admirers everywhere." The secretary regrets that by his fault it has been necessary to wait for nearly 10 years before giving this information to Henry Warren's fellow Alumni. He is sure, however, that all will be glad to have this recognition given here, even so belatedly. There are undoubtedly other classmates, still living, who have hidden their achievements from us. We are too old to be bashful, so send the secretary a brief statement of your triumphs now. — SAMUEL C. PRESCOTT, *Secretary*, Room 16-317, M.I.T.

'95

From the M.I.T. Alumni register, as of February 3, 1960, we received a change of address for Dorville Libby, Jr., from 281 41st Street, Apt. 33, Oakland, Calif., to 1118 Barrett Avenue, Richmond, Calif.

That did not change our count of two most distant members being in California, as our architect Robert D. Farquhar, 2930 Avalon Avenue, Berkeley 5, Calif., is our other retired member. In his early days he and a bunch of other M.I.T. men kept house in Paris, France, at No. 3 rue Laufflot, while attending the Ecole des Beaux Arts. Among them were Frank and Ben Holden'94, Guy Lowell'94, Charles Merrick Gay, IV, who later was associate director of Franklin Institute in Philadelphia, and W. Powell Robins. All gone now except Robert. Good Boy! Keep it up and perhaps you will come here next June and give us more news of old times.

Besides our two California members, who in these days of air travel may think it nothing to take a plane after breakfast, have a 65th meeting and luncheon with us in Cambridge, meet other old-time M.I.T. friends and be home again in time for supper, we have George Bixby, Columbus, Ohio; Fred Harris, New Smyrna Beach, Fla.; Rittenhouse Moore, Virginia Beach, Va.; and Judson Dickerman, Charlottesville, Va. All near enough to count on being here. Come one, come all! — LUTHER K. YODER, *Secretary*; A. D. FULLER, *Assistant Secretary*.

Happy Birthday

Among the Alumni of M.I.T. now there are 83 nonagenarians and 787 octogenarians. Birthday greetings are in order during April to one who is due to become 95, to four, two, and ten who are due, respectively, to celebrate their 90th, 85th, and 80th, as listed below with dates of birth:

April, 1865—DR. MARY L. FOSTER'97, on the 25th.

April, 1870—MISS ELIZABETH GREENMAN '06, on the 12th; CHARLES H. KINNEY'94, and MRS. ALICE H. POUGH'92 on the 21st; and JOSHUA T. DANIELL'93 on the 27th.

April, 1875—HERBERT S. PHILBRICK'06 on the 13th; and CHARLES W. HAPGOOD'96 on the 18th.

April, 1880—CHARLES K. FLINT'01 on the 1st; JOHN F. HECKMAN'03 on the 3rd; HARLEN M. CHAPMAN'02 on the 4th; GEORGE N. TAYLOR'04 on the 7th; THEODORE H. TAFT'01 on the 8th; J. WALLACE TAYLOR'05 on the 11th; ARTHUR R. NICHOLS'02 on the 15th; OGDEN R. ADAMS '06 on the 16th; ARTHUR B. ALLEN'03 on the 25th; and ARTHUR J. FOOTE'10 on the 28th.

'96

Concluding Will Coolidge's trip around the world: "The temples of Bangkok are impressive. In one of them, there is a Buddha weighing five and a half tons, while in another temple, a reclining Buddha is 150 feet long. This last one is of brick and stucco, covered with gold leaf, while the bottoms of his feet are inlaid with mother of pearl. On a snake farm in Bangkok, we witnessed the forced feeding of snakes, such feeding being necessary for production of venom for antitoxin.

"We arrived at Calcutta at 2:30 one morning, where, on our way to our hotel, we saw hundreds of people sleeping on the sidewalks — a harrowing sight never to be forgotten. Here we saw cattle roaming at will over streets and sidewalks, carefully avoided by the dense traffic. Also, we heard of an open-air bargain — a hair-cut, shave, and wax removal from the ears, for 10 cents, U.S. money. In Nepal, close to the Tibetan border, our group was privileged to enjoy an audience with the representative of the Dalai Lama. Here, and then later in Vale of Kashmir, we had the most thrilling views of some of the highest Himalayan peaks.

"Our most breath-taking experience was at Agra, where we first saw the Taj Mahal by moonlight. New Delhi is a beautiful city with many fine buildings, including those of the national parliament, Nehru's central secretariat and our embassy. We visited the simple and impressive memorial to Mr. Gandhi. To this spot, where his ashes are buried, come many pilgrims to pay tribute. At his home in New Delhi, we visited another memorial in which important events in his life are portrayed. While one is depressed by the poverty of the Indian masses, one is inspired by the great moral and artistic contributions

which India has made to the world throughout its history.

"The American University in Beirut made a very fine impression, just as the American farm school in Greece had on an earlier trip. Through the years both of these efforts will contribute substantially to raising the standard of living in Lebanon and Greece, and one hopes that such fruitful and unselfish contributions will be made in many other countries. We received friendly treatment everywhere. It was surprising to see how many native people, in the countries visited, understood and spoke English. We came away with the feeling that English is far on the way to becoming the universal language. Our visit to the Jordan area of the Holy Land made the Bible really seem like history to us. We were glad to see the efforts being made here to provide adequate housing for the Arab refugees. The whole trip made us more conscious than ever before of the great religions of the world and of their ethical and esthetic contributions to human society."

The secretary has received announcement of the marriage on January 2 of Miss Hattie L. Gates and Mr. Arthur F. Campbell at Brookline, and news of the same from the Alumni Office giving the Hotel Beaconsfield in Brookline as their address. Those of us at the recent June meeting met Mr. Campbell. We in the Class of '96 wish the married couple a very happy, healthy, and prosperous life together.

From 140 East Market Street, Bethlehem, Pa., Mrs. Bradley wrote: "My warmest thanks to the Class of '96 for its kind letter of sympathy. My husband had a great love and admiration for M.I.T. and for the '96 men." — JAMES M. DRISCOLL, *Secretary,* 129 Walnut Street, Brookline, Mass.; HENRY R. HEDGE, *Assistant Secretary,* 105 Rockwood Street, Brookline, Mass.

'97

It is the secretary's sad duty to report the deaths of three members of the Class. Leonard M. DeMeritt, II, died July 1, 1959, at Homewood Apartments, Baltimore, Md. . . . Miss Helen E. Keep died November 8, 1959, at Royal Palm Hotel, located in Detroit, Mich.

Have ideas for a reunion this year occurred to you? If we are to have one we should make plans well in advance. Your suggestions will be appreciated. — AUGUSTUS C. LAMB, *Secretary,* 61 Hillcrest Place, Amherst, Mass.

'98

By a peculiar mischance both Fred's eyes and those of yours truly require resting to recover from a lingering malaise. We think that there will be no more trouble after one more month's rest, so that the boys and girls of '98 may expect class notes to resume with the May, 1960, issue of The Review. — EDWARD S. CHAPIN, *Secretary,* Hotel Vendome, 160 Commonwealth Avenue, Boston 16, Mass.; FREDERIC A. JONES, *Assistant Secretary,* 286 Chestnut Hill Road, Brighton, Mass.

'99

Through the courtesy of Mrs. Ralph Sador, daughter of Frank Edward Hermanns, I have received word of his death on October 22, 1959, and the following outline of his professional career: In 1907 he was professor of railroad engineering at the Imperial University in Tientsin, China. Later he worked with the Chinese government as engineer on the construction of the Hangow railroad. He returned to the United States in 1911 and became professor of civil engineering at the Stevens Institute of Technology at Hoboken, N.J., where he headed the structural engineering department until 1924. He also became interested in developing property and building in Westchester County, N.Y., chiefly in Bronxville where he lived until 1956 when he moved to Rye, N.Y.

A clipping from the *Boston Herald* states that Cardella D. Brown, 85, of Swampscott, Mass., a retired General Electric Company engineer, died on November 24, 1959, at the Lynn Hospital.

Changes of address: Ralph H. Pinkham, formerly of Indianapolis, Ind., is located at 1401 S.E. 2nd Court, Fort Lauderdale, Fla. William White, formerly of Brockton and Falmouth, Mass., is at The Homestead, 11 Silver Street, Taunton, Mass. — BURT R. RICKARDS, *Secretary,* 349 West Emerson Street, Melrose, Mass.; PERCY W. WITHERELL, *Assistant Secretary,* 84 Prince Street, Jamaica Plain, Mass.

'01

As these notes are written in the middle of February, replies to the class letter are coming in very well. It looks as though the wording at the top of the last page did some good. Keep it up.

You noticed the name of Bill Sturtevant among the deaths recorded in the letter. Since the letter went out I have received more information about him. He had been ill for about four months following a heart attack last August. He had been an official of the B.V.G. and E. Company for 39 years and was assistant manager in charge of electric service when he became ill. The president of the company said he was one of the most respected and loved executives they had ever had. He was a member of the Central Congregational Church and the Pawtucket-Blackstone Valley Chamber of Commerce. His wife died several years ago. He is survived by a daughter and a sister.

I have just received word of the death of Frank A. Smith, II, of Melrose, Mass., who passed away on January 15, 1959, as the result of a heart attack. I do not understand why I have not known of this before.

Willard Dow, IX, is one of our most youthful members as far as feelings and physical condition are concerned. He doesn't retire from business because he would feel lost. He says that he had a date to play indoor tennis doubles and played squash five times in one week. He is the oldest living player at the Boat Club. Keep it up "old man," the rest of us envy you. . . . Dennis Haley, III, from New York, writes as follows: "Still active as a consultant mining engineer. The number of 'Ols that passed away last year is rather frightening but I guess it must come. I wrote you a short time ago that I had taken a two months' tour of the Far East. Wife said it was getting later than I thought so we shoved off and had a wonderful time."

From David Cowell, VI, Hingham, Mass.: "Had a birthday in January, 82 years old. Am all right except my knees do not work comfortably so I do not go where there is walking. My Army boy and Air Force boy are now back in the U.S., one in Florida and the other in Texas with their families. While the airman was stationed at Lake Wales, Mrs. C. and I would spend January, February, and March there. For amusement I am checking over and clearing out my collection of steam railroad clippings which run from 1857 all the way through 1943."

Arthur Davis, V, of Gloucester, Mass., says: "I have retired and have lived alone in a quiet way since the death of my wife in 1956. I have two children, five grandchildren and twelve great grandchildren all living and a source of much pleasure and satisfaction." . . . E. H. Pendleton, III, New Jersey: "Now preparing the fourth volume about the Pendletons." . . . Arthur G. Hayden, I, Maryland: "I read the class notes avidly but nowadays have little to tell about myself — haven't drowned again or done anything exciting." Keep our 60th reunion at Dedham in 1961 in mind. There won't be too many more. — THEODORE H. TAFT, *Secretary,* Box 124, Jaffrey, N.H.

'02

We regret to record the sudden death of Arthur P. Hall in Boston on January 18. Hall was a native of Charlestown where he was born July 20, 1880. He prepared for M.I.T. at Boston English High School and entered with the Class of 1902. As an undergraduate he was interested in theatricals and took part in "Medicine Man" and "Grand Duke." His thesis was entitled the "Test of 7-inch Blanchard Air Compressor." After graduation he went to Germany to study, first at the Hochschule at Charlottenburg and then at the University of Berlin. While there he did some special work for the American consul and wrote some articles for the periodical *Gummi Zeitung.* On August 15, 1903, he married Caritas Fuhrmann in Berlin. About 1905 they returned to America and Arthur became a chemical engineer with the Saylesville Bleaching Company in Saylesville, R.I. After a considerable time he joined the Kinney Manufacturing Company, manufacturers of pumps, as a sales engineer. He had an excellent record here, but due to conditions brought on by World War I he resigned.

While in Germany Hall had been interested in the cleaning processes, so now he launched the Priscilla Cleansing Company with headquarters in Boston. This he successfully operated for 20 years and became well known among his business associates. At one time he headed the New England Association of Dyers and Clean-

sers. Due to unfavorable conditions during World War II he disposed of the business after which he became connected with the Deecy Products Company in Cambridge. When as one of the older men he was released during a slack period, he bought a home in Chocorua, N.H. The family moved up there and Arthur kept busy raising raspberries and operating a wood turning shop in his barn. Eventually the winters became too severe for Mrs. Hall and they began spending the cold months in Boston. The last two winters Arthur had been working at the Massachusetts General Hospital, where, according to his superior, he had done a fine job in inventory control for the hospital pharmacy and was about to be transferred to a new and more important position. Hall is survived only by his wife, their son having died of scarlet fever at an early age. Dan Patch represented the Class at the funeral, which was held at the Waterman Chapel in Boston on January 22.

Only the secretary understands how difficult it is to get news from members of the Class, so this letter to Hall from Duncan Wemyss forwarded by Mrs. Hall, is gladly quoted here. Dated December 13, 1959, it reads: "Have been twice in the hospital and laid up off and on this last year. I get very little news except from The Tech Review. Glad to hear you can still earn a dollar. I have spent some time on the Maine coast during the last few years but would get lost in Boston now. You shouldn't get me mixed up in any of your partridge poaching. I am a real 'hunter-go,' walk around a while and then take a nap and drive home again. Some one gives me a bird occasionally. The deer and birds feel safe when they see me now. Still own a car but doesn't take much time at my age to get in Dutch with the license officials." We assume that Dunc's little red De Soto is no longer running. . . . Dan Patch is happy to be the great grandfather of twin boys, Kevin Alan Street and Keith Edward Street, born in Mt. Vernon, Ohio, January 15. . . . Robbie, our Vice-president, writes that Brunswick, Maine, has had a pleasant winter and that he has survived the celebration of his 80th birthday. — BURTON G. PHILBRICK, *Secretary,* 18 Ocean Avenue, Salem, Mass.

'03

We like to note when a son follows in the footsteps of his father. Our own Andrew Hepburn, IV, has a son Andrew Hepburn, Jr., who also has taken up architecture and has recently received favorable comment for novel house designing. Having among his prized possessions an eight-foot model of the *Kenilworth,* a famed World War II vessel, and an eight-foot high antique writing desk of Santo Domingo mahogany, he decided to design a new home with these in mind. The ship's model stretches across the entire width of the den. Old woods, doors, and mantels, provide warmth and charm to his Concord, Mass., home.

May we urge our Florida classmates to send in their summer addresses, with their vacation plans. — LEROY B. GOULD, *Secretary,* 36 Oxford Road, Newton Center, Mass.; AUGUSTUS H. EUSTIS, *Treasurer,* 131 State Street, Boston, Mass.

'04

Maynard Holcombe has come to our rescue again otherwise we would be obliged to hang out a "No News" sign. His note is as follows: "The Palmers will be at Winter Haven from February 15 to March 1 and we are planning for a class luncheon at the Haven Hotel on February 22. Some of us will probably stay over until the 23rd to play shuffleboard, as golf is a bit strenuous even in Florida for more than nine holes. I expect the Coupes and Newells to be there and perhaps Rich Sheafe and Irene. If you know of any classmates who will be wandering by at that time, steer them to the old Haven Hotel for noonday lunch on the 22nd. It will be a treat for them and a surprise for us.

"The weather has been good this season. The occasional cold spells have not hurt the fruit, though some of the vegetable crops got hit. Anyone wanting to stay over for a day or two can probably be taken care of by writing the Haven Hotel in advance and saying that they are friends of the Palmers — the management has always been glad to take care of us in the past and it is an interesting place. The Cypress Gardens are close by and also Lake Wales with the Bok Tower, the Passion Play, and the Great Masterpiece. I expect my brother Arthur here for a couple weeks starting February 4. We will be playing a lot of easy golf courses, in case anyone is interested."

Unfortunately, we haven't been able to steer any classmates to the South and when you read this the trend will be northward. That is an unfortunate part of the wide gap in time between writing these notes and getting them in print but there seems to be no remedy for this. We thank the Florida group for the kind invitation. We are sure they had a pleasant reunion.

As these notes are being written (February 11) we have a temperature of 60° in Boston and heavy spring showers. — CARLE R. HAYWARD, *Secretary,* 35-304, M.I.T. Cambridge, Mass.; EUGENE H. RUSSELL, JR., *Assistant Secretary,* 82 Devonshire Street, Boston, Mass.

'05

By the time you read this you will have received formal notice of the "when and where" of our 55th reunion. At the time of writing it appears that we should have at least 50 (total) present. It has occurred to me that at our 35th (25 years ago) you first elected me as your secretary. I consider it a lucky break as I have had personal (by correspondence) contact with most of my classmates.

Correspondence in regard to the reunion has brought many interesting news items. For instance this one from Willard Simpson: "I am looking forward to being at our 55th reunion this June. Sure hope that we can make it. I haven't talked Mary into flying up there yet. That is the way I would like to go if I could pick out some nice day when flying was good. I don't care to fly about when the weather is bad; you are bounced around and can't see where you are going. Down here, you know, that kind of weather rarely exists, so flying in Texas is a joy. The planes fly low enough so that you can see the ground and really learn what the country looks like. We can fly to Dallas or Houston in just about an hour or a little less, to El Paso or Amarillo in two hours. When I have work in El Paso, I have breakfast at home, fly down in the morning, do my job in El Paso spending four or five hours there, and am back home for supper. In the meantime, I have flown 600 miles out and 600 miles back.

"I haven't done as much hunting as usual this year. I generally go out at least four times and get one or two nice buck deer and some turkeys. This year I have only been out twice and got three turkeys and no deer. We are not allowed, under the game laws, to shoot does in Texas; consequently, there are nothing but does left. On both occasions I was hunting I saw hundreds of does and no bucks of a size I would want to kill."

John Damon writes: "I am not quite out of the foreign service yet but am taking a week at home with my son before going to Washington for a week for the final wind-up. The Korean situation is very complicated when you are right in it for a few years and after a while things need to be simmered down to highlights to maintain a proper perspective. It has been a challenging and interesting job and I do not regret the years I have put into it. In fact I hated to leave a lot of things unfinished. However, the years have a way of catching up on us and I am less efficient and less able to keep up sustained effort under difficult circumstances than is needed for the best results. The only trouble is that the Washington personnel division has failed to produce the younger man for replacement."

Arthur E. Russell, now living in retirement in Miami tells of his recent travels: "I have taken two trips to the Caribbean and last fall went to New Orleans. My Caribbean trips included visits to Puerto Rico and the Virgin Islands (St. Thomas and St. Croix.) I flew north to spend Christmas with my daughter in Melrose, Mass., as I do every year."

It was good to hear from Lloyd Buell, after several years, as follows: "Since retirement in 1949 after 30 years with Phelps Dodge, I have been occupied handling the office on construction jobs. There have been four of them in El Paso, Abilene, Texas, and Camden, Ark. It has been something new and fun. The last was completed in November but just now I am temporarily back to close up another contract due to resignations and transfers.

"Our three children (and nine grandchildren) are scattered and their mother and I find this as central a location as any. We have no immediate plans for moving from El Paso."

Ed Barron, whom we had not heard from since our 50th reunion reports: "Am glad to say so far my health and Mrs. B's have been very good. There is nothing very startling to report. We live a very simple, uneventful life on the whole. My

three grandchildren, two girls 17 and 16, and Edward Barron Colbaugh, 14, are one of my main interests. I don't know yet how I ever made M.I.T., and graduated, although requirements were much less strict in our day.

"Lucy and I often recall the good time we had at our 50th and would like to go to the 55th."

Art Manson, commenting on the fact that his son, Arthur J., Jr.'34, registered his father for the 55th, while attending Alumni Day 1959, says that he hopes to keep the date. Also: "I stay busy keeping house for my daughter and taking care of my lawn. In addition I am a photo fan and spend time with my picture work — black and white and color slides. Came home last June from a seven weeks' tour of Japan and one week in Hong Kong and Manila. I took over 800 Kodachrome slides. Have put about 700 of them in four groups. I write my script then record it on tape, playing the country's music in between rack changes. Have shown them to many friends, also to camera clubs."

Fred A. Pirie (remember how he used to keep that old piano jumping?), keeps us posted as to his status, thusly: "Mrs. Pirie and I are enjoying good health, with activities somewhat limited. I am still working but on a much smaller scale, and in truth, I like it. I am looking forward to spring, when I can start to 'putter' in the garden. My grandson, also F.A.P., entered Dartmouth this fall. Shortly thereafter, he was awarded a Daniel Webster scholarship, something his grandfather would never have merited."

A. Warren Wells, in regretting his probable inability to attend the reunion, says he expects to be traveling West this summer as he has a great granddaughter in Boulder, Colo., he has not seen yet. There are many other classmates who have great grandchildren, but to me with my oldest grandchild only 13, it seems wonderful.

A letter from Norman "Ski" Lombard, now living in Fort Lauderdale, Fla., contains much literature in regard to the Institute of Applied Citizenship, Inc., of New York City, of which he is still president. It seems that he travels broadly (his letter was mailed from Seattle) in establishing "joint community committees" in the interest of I.A.C., Inc. If you are curious as to what all this means write him at 4863 N.E. 4th Avenue, Fort Lauderdale, Fla. At any rate his interest in this civic work again prevents him "from spending the time and money to attend a class reunion."

Through Roy Allen I got a clipping from a trade paper which tells of one of Charlie Mayer's hobbies, namely bowling. It says: "Charlie 'Tiger' Mayer, who celebrated his 79th birthday last month, started bowling before the turn of the century at the age of 17 in his home town of Madison, Wis. Charlie, who was an old tennis player and golfer, graduated from M.I.T. He has bowled in Boston, Indianapolis, New York, Brooklyn, and now in California, has participated in many state tournaments for Kiwanis in both bowling and golf. And no matter how good or how badly Charlie bowls, he always remains the same, a perfect gentleman, a real sportsman." Many more happy bowling years to you, "Tiger."

I have regularly quoted from Herb Bailey's annual Christmas newsletter to his family. I am sure these selected paragraphs will interest his classmates: "For regular jobs there are the Civil Service and county school board. These mean many 20-mile trips to the county seat. Fortunately, my driver's license is good until 1963. Boy Scout activity is decreasing, but I still enjoy the council meetings and especially testing boys in camp cooking and stamp collecting. Then there is the oldsters Sunday school class in church history, the judging of exhibits at the county schools' science fair and helping at various art exhibits as trustee and board member of the Community Art Association.

"However, pottery continues to be the old man's chief interest and just now the problem is what to do when the college moves to its beautiful new campus 10 miles east of Ontario. The 'old kilnmeister' will probably ride the bus back and forth daily for he really enjoys the potters as much as his pots. I worked a little during the summer session of ceramics classes and then stayed on with several students who wanted to work a little longer. I had two very happy visits with Edgar and his family. The first was in January when the National School Board Association met in San Francisco and again in October after the international meeting of civil service personnel."

We have these changes of address: Mrs. Gretchen H. Waldo is now Mrs. T. Mott Shaw, with winter address 85 Pinckney Street, Boston 14, Mass.; Colonel Robert S. Beard (perhaps wintering) at 1536 Oxford Street, Berkeley 9, Calif.; Mail to James E. Rogers, c/o Corbett Turger Company, 39 Broadway, New York City has been returned marked "moved, new address not given." Can anyone supply the new address?

Through his daughter in Fresno, Calif., we learn that John S. Loughlin, II, died at her home the latter part of January. John, in his 84th year, had driven from Gloucester, Mass., last summer to see me, and, I suspect, to inwardly say good-bye. He left for his daughter's, where he shortly afterward had an operation. John, prior to his retirement, lived all his life in Dorchester, Mass., and was employed continuously by the Associated Factory Mutual Fire Insurance Companies.

James B. Whitmore, II, died at Bloomfield, N.J., on December 15 after a very long illness, the last few years of which he was hospitalized. Jim had a varied business career. During his later years he had been employed by Westinghouse at the Belleville Base Works, was plant superintendent and research engineer.

Fred J. Wilkiemeyer, 845 Vienna Street, San Francisco, Calif., passed away on August 27, 1959. The information was given by Rev. V. S. Wilkiemeyer. Fred entered Harvard Medical School in September 1905, getting his degree in 1909. Have heard little from him since 1915. . . . Captain C. M. Simmers, U.S.N.(Ret.) reports the death of his wife in November 1959. They had been married 54 years. — FRED W. GOLDTHWAIT, *Secretary and Treasurer,* Box 32, Center Sandwich, N.H.; GILBERT S. TOWER, *Assistant Secretary and Treasurer,* 35 North Main Street. Cohasset, Mass.

'06

Perhaps we should set the record straight for Carroll Farwell because he had not told me he "was only semi-tired," as the January notes had it. My notes read "only semi-," purposely leaving off the "retired" but evidently it was added and then the printer did his part. However, I got a big kick when I read it and Jim told me later that is the way he is going to be from now on! How are you feeling these days?

Several letters have been received recently, a personal one from Bob Cushman, II, who said he and Ruth get in touch quite frequently with Bill Cady's widow. . . . Sherm Chase had a hunch that the personal notes on his January 15 class agent's letter "stimulated a few personal replies." One was from Art Sherman, I, and, believe it or not, another one from Abe Sherman, VI. Art's big news was that he and Mrs. Lillian Bailey Williams were married in Washington, D.C., on November 29. He also wanted to know if anyone needed a cataract, as he had a completely useless one and was hoping to dispose of it in February. So by April Art may be seeing things — better! Our rather belated, but nonetheless sincere, best wishes to Art and Lillian.

Abe had written to me late in December and confessed that the "years are creeping up on me." He expected they would be in Sarasota by December 31, and they were, according to his letter to Sherm in which he made some suggestions. Seems Sherm is semi-retired, too, as on January 1 he ceased to be a partner in Metcalf and Eddy, but is retained as consultant for a fixed number of days per year. Abe wanted to know "why only halfway? I should think you would like to learn how to loaf. Better leave the mean winter weather up there and come down here for awhile." However, in a letter early in February, Abe did allow that "since mid-January the weather hasn't been too co-operative, although down here we don't have to *shovel it.*" By March, when Sherm and Bertha expected to be there, Florida was probably in full bloom and the swimming somewhat more enjoyable. Quite a few '06 couples and stags were there during the winter months — the Farleys, Batchelders, Guernseys, Kendalls, Max Coe, and Phil Stanley, possibly others — besides the numerous permanent residents. Abe had had a pleasant visit with the Guernseys and found Burton Kendall with Claude McGinnis in Clearwater.

Percy Tillson, VI, gets the brass ring this month for the copious and interesting news he has contributed. In January he and Annetta attended the annual dinner and Past Presidents Night of the M.I.T. Club of Philadelphia, having been president in 1920. Among the nine other invited guests was Jerome Harrison, IV, president in 1925. No other '06 man attended although there are several others living in and around Philly. Percy harked back to the early days after our graduation when Philadelphia was "a hotbed of '06 men — Dean, Allyn Taylor, D. C. Davis, Powell,

and Wolf. For a while we all lived together. Then came McGinnis, Cheney, White, Emerson, Sargent, Terrell, and Booth. With some '05 men we brought the club to life, Booth was made secretary, we held monthly dinners (one buck), an annual dinner meeting, and an annual field day. Orcutt used to come down from Phoenixville and Chase from Reading." Percy contends that '06 was the backbone of the club for some time. The present club is much larger and more efficiently conducted, but he doubts if they have as much fun as his gang did.

Along with his letter came a report I have been hoping to get — "Around The World With SITA., April 7 to June 16, 1959." Being a perfectionist, Percy covers that trip in great detail — east to west over four continents in 15 countries and colonies, including the U.S.' 50th state. To do it they made 25 plane flights, five rail trips, three steamer rides, beside auto, motorboat, bus, camel (Egypt), donkey (Greek islands), rickshaw (Hong Kong), and pedicar in Macao, Bangkok. Where did they sleep? He says 54 nights in 27 hotels, four aloft, three afloat, one railroad sleeper, one tent (Giza desert), and seven with relatives in Seattle. To include the high spots of all their stops would take too much space I'm afraid, but I may cover them in later notes when hot news is scarce. Percy concludes: "U.S.A. no place like home — good American water (iced), coffee, food, people!"

I was chagrined recently when I had missed the report in our Wellesley *Townsman* of the death on December 9 of Harold Clifford Elliott, I, in West Harwich on the Cape, and received the clipping through the Alumni Office. Harold prepared at Phillips Exeter, and was with us the first two years then moved over to Harvard, class of 1907, and later took some courses at Boston University. He had resided in West Roxbury and was in the metal manufacturing business, Eco Manufacturing Company, in Boston for 25 years or so. In the early 'thirties he was with the National Patent Corporation and for several years was a field representative with the Home Owners Loan Corporation. He resided in Wellesley for 30 years before moving to the Cape about a year ago. Harold is survived by his wife Margaret E. (Macfarlane), a son, daughter, and one grandson. A note of sympathy has been sent to his widow and children.

It isn't often that a classmate meets death in an auto accident, but it happened to Lawrence Edward Stone, VI, on February 8 in Sarasota. Alert Abe Sherman sent in part of the front page of the Sarasota *Herald-Tribune* of February 9 covering the two-car accident, with a picture of his car. It had been struck on the right side just forward of the front seat and almost cut in two. It was "Sarasota County's first fatal accident of the new year and brought death to a 76-year-old Sarasota man and a charge of manslaughter against a 71-year-old Sioux Falls driver." Why any driver will go through a stop light at the speed he evidently did is beyond me. So stay alert, and stay alive. Lawrence, we believe, was born and lived all his active life in Cleveland and Cleveland Heights, except during the years he attended Harvard (B.A. 1905) and a year with us as a graduate student, when he roomed at Tech Chambers. Abe said he knew him well that senior year. Our records have no information about the next few years but he evidently returned to his home town to enter a family real estate business. M. C. and I. N. Stone. He was associated with the business as secretary and treasurer, general manager, and president, until his retirement to Sarasota by or before 1950. During the late 'twenties he had obtained an LL.B. from Cleveland Law School. Lawrence is survived by his (2nd) wife Dorothy, a daughter, two sons, a stepson, and nine grandchildren. Our heartfelt sympathy is extended to his widow and children. — E. B. ROWE, *Secretary-Treasurer,* 11 Cushing Road, Wellesley Hills, 81, Mass.

'07

In the 1907 notes for January, 1960, I asked for any information about Frederick G. Coburn, as the Alumni register had notified me that he had moved to Marshfield, Mass. Recently, I received a letter from Dan Patch'02, with the following information about Fred: "He was a graduate of Annapolis who was assigned to M.I.T. for the course in Naval construction, being awarded an S.M. at its completion. Fred has been connected with the Harvard Graduate School of Business Administration, Bethlehem Shipbuilding Corporation, Sanderson and Porter, Engineers, The Aviation Corporation, McLellan Stores Company, President of the Brown Company of Berlin, N.H., and more lately has been associated with Jackson and Moreland." Last July Fred retired and moved to Marshfield, where he will have ample opportunity to enjoy his hobby of gardening.

Your secretary celebrated his 50th wedding anniversary on January 26, 1960. Some of the '07 men will recall that I was married in Needham, on the same evening that Ed Squire was married in that town, and that a few of our '07 friends attended both receptions. George Griffin was my best man. It was one of the regrets of our recent celebration that George and Ellen Griffin were not able to come to Whitinsville from Woods Hole to have a part in the festivities.

Although a thorough perusal of the *Boston Herald* has been made each day, there is no news of '07 men in and around Boston to report. Again, this is an appeal to have the fellows of the Class send in any items of interest about themselves or their classmates. — PHIL WALKER, *Secretary and Treasurer,* 18 Summit Street, Whitinsville, Mass.; GARDNER S. GOULD, *Assistant Secretary,* 409 Highland Street, Newtonville 60, Mass.

'08

Our 52nd reunion will be held at the Melrose Inn, Harwichport, Mass., on the Cape, June 10, 11 and 12, 1960. Headquarters will be the Beach House as in the past. This is our fourth party at the Melrose Inn so you will feel at home. Remember! Ladies are invited. When you receive the official notice from Les Ellis, our treasurer, please reply promptly as it will greatly help the committee make plans. Monday June 13, is Alumni Day at Cambridge, a fitting conculsion for our 52nd.

Wilfred E. Booth — "Bill" to you — has taken over as our class agent. George Belcher who served so faithfully and successfully for 14 years felt he was entitled to a sabbatical and we had to agree. Thanks, George for a swell job. We hope you will support Bill as you have George in the past. By the way, how about the Alumni Fund? Have you made your subscription for this year? If not, please do so right away, so '08 can make a good showing. You did nobly for our 50th. Let's keep it up. The fourth and final dinner meeting of the Class for the 1959-1960 season will be held at the M.I.T. Faculty Club, 50 Memorial Drive, Cambridge, on Wednesday, May 11 at 6 P.M Ladies are invited.

Harold S. Osborne, immediate past president of the Regional Plan Association, was honored by the Association during the past year. Mr. Osborne was presented with the Regional Plan Award on October 7, 1959. The award is presented from time to time on vote by R.P.A. directors to a person, organization, or community in the region which has distinguished itself by contributing to orderly and desirable development through the planning process. This award was presented to Mr. Osborne at the Association's 30th anniversary held October 7 at the Hotel Roosevelt in New York City.

The text of the award citation is as follows: "For his vision of a New York metropolitan region designed to provide for every man a better setting for living and work; for his leadership in pursuing this goal by arousing the interests of the nation's great foundations and universities in studies of the changing social and economic structure of the New York metropolis; for his success in laying the base for a new regional plan of New York and its environs; and for his dedication — in his community and his nation — to the concept of co-operation among all in the planning of a better environment."

Jimmie Burch was in town January 28, following a lumbermen's convention in New York City. While he came primarily to see an elderly uncle who resides in Chestnut Hill, it enabled him to entertain your secretary and Frank and Mrs. Towle at dinner in the Terrace Room at the Statler-Hilton with its fine floor show. I wish Marie could have been with Jimmie, but she was vacationing at Hot Springs. Many thanks Jimmie for a wonderful evening.

I am sorry to report the death of Robert C. Angell on November 27, 1959. While Bob hadn't been back to reunions, those who were in the musical clubs will remember him. He had always been with the S. S. White Dental Manufacturing Company, Prince Bay, Staten Island, N.Y. — H. LESTON CARTER, *Secretary,* 14 Roslyn Road, Waban 68, Mass.; LESLIE B. ELLIS, *Treasurer and Assistant Secretary,* 230 Melrose Street, Melrose 76, Mass.

'10

I regret that I have to announce the death of Harry F. Thomson on November 7 of a heart attack in Mexico City. He was one of the earliest producers of ready-

mixed concrete in the United States and was active in that field for 28 years. From 1927 until 1948, he was president of the General Materials Company of St. Louis, and from 1950 to 1955 he was vice-president of the Material Service Corporation of Chicago. Since his retirement in 1955, he had been active in consulting work. He also served as a director of the American Society of Civil Engineers for the 1945-1947 term.

I have also received notice of the death of Gordon R. Fulton who died April 16, 1959.

I hope the following announcement of the 50th wedding anniversary of Luther Davis and his wife is the forerunner of many similar notices I may receive in the future: "Mr. and Mrs. Luther Davis of 49 Pond Street, Needham, Mass., recently celebrated their 50th wedding anniversary. They were honored at an open house given by their son and his wife, Dr. and Mrs. Luther Davis, Jr., of Wayland, Mass. He is a biologist for Haffenreffer and Company, Inc. Mr. and Mrs. Davis were married on February 16, 1910, in St. Mark's Church (Episcopal), Dorchester, Mass. They have two grandchildren, Hunt Collyer Davis, six, and Nancy Locke Davis, three." As Luther is the first member of the Class to celebrate 50 years of married life, your secretary sent a congratulatory note and token he thought would be appropriate. Dr. Luther Davis, Jr., Luther's son, graduated from M.I.T. in 1942 and received his doctorate in 1949.

I had a short note from John Barnard recently. He is leaving the management of his Boston office to his son while he practices architecture from his office in Osterville on Cape Cod, where he has a most attractive home. . . . Hal Manson and Jack Babcock keep in constant touch with me in making preparations for our 50th reunion. At present the prospect of a record attendance appears assured. — HERBERT S. CLEVERDON, *Secretary*, 120 Tremont Street, Boston, Mass.

'11

William Dewey Foster, IV, who passed away April, 1958, was honored last year by the establishment of a memorial fund in his name for the benefit of the library of the American Institute of Architects. In April, 1959, a check for $2,000 was turned over to the Institute. The income of the fund is to be used for the benefit of the library, preferably for the purchase of books on the history of American architecture. The books will be identified by a special bookplate.

A letter from Bill Orchard, II, in February said: "In connection with the 50th anniversary class alumni fund solicitation, I received a card for Brigadier General Lawrence B. Weeks, VI. I called his home and in talking to Mrs. Weeks was distressed to learn that the General had died on November 24, 1959. For several years Lawrence and I had been living within three miles of each other, but unfortunately our paths had not crossed. I recall a very pleasant association with him during a couple of summers in Ogunquit, Maine, when he, as a young man and some of his family, and I, as a youngster with my family, were at the same summer resort." Our sincere sympathy to Mrs. Weeks, and best wishes for the future.

Progress is reported with respect to the Dennis memorial window, and it is expected that it will be installed in St. Andrews Church sometime this summer. It was mistakenly designated in the January Review as the Trinity Church. Additional contributions to the O.B.D. memorial fund would be greatly appreciated, and should be sent to Roy MacPherson, 80 Warren Road, Framingham. A check was received from Dan Patch, Class of 1902, who wrote: "O. B. was bigger than just one class." Thanks, Dan.

A letter in January from Irving Wilson, XIV, said: "I am very sorry to learn that Don Stevens feels he must resign as our class president. Coming as this does after Dennie's death certainly brings home the fact of passing years. Both Don and Dennie have been tremendous assets to our Class. I am sure that Obie Clark will develop and maintain very real interest in our 50-year reunion, and I am looking forward to it as an opportunity to see many of you whom I meet with all too seldom. When I look back to the time I cast my lot with Alcoa, right after graduation in 1911, it is astounding to realize the developments which have taken place. I have been most fortunate to participate in this growth and development, and regret that I cannot be around another 50 years to see and have a part in the even greater developments ahead for aluminum. I hope that as we approach our 50-year reunion each of us will make sure that he does all he reasonably can to make the 1911 class gift one of which we can all be proud."

Harold Robinson, I, wrote to Carl Richmond in January: "Talked with Harry Latham'93, the other day. He is 88 years old and, like me, has nearly lost his sight. Had to get out of the local M.I.T. club, as I do not go out evenings." We sincerely hope that Robby and his friend will at least keep what remains of their vision, and extend our sympathy to them for what they have lost.

Cleon Johnson, X, Bob Morse, VI, Bill Orchard, XI, Dick Ranger, VIII, and Don Stevens, II, our classmates from northern New Jersey, dined on February 2 at the Essex Club in Newark. Their main discussion was the feasibility of a plan to assign Alumni Fund donations to scholarships, which would, of course, need the approval of a majority of contributors. Johnson was selected as contact man, so he will probably get in touch with you.

The following address changes have been received: Stuart B. Copeland, II, P.O. Box 236, Venice, Fla.; Norman Duffett, X, 205 South C Street, Lake Worth, Fla.; and Samuel M. Schmidt, 691 North Crescent, Cincinnati 29, Ohio. Another change is an additional name to the firm with which Ralph T. Walker, IV, is associated. It is now Voorhees, Walker, Smith, Smith and Haines, with the same address, 101 Park Avenue, New York 17, N.Y. Your secretary would appreciate it very much if everyone who gets hold of any news relative to 1911 would send him the details. — HENRY F. DOLLIVER, *Secretary*, 10 Bellevue Road, Belmont 78, Mass.; JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

'12

Word has just reached me of the death of Emory M. Marshall, who suddenly passed away from heart failure on June 23, 1959. Emory was a graduate of the Colorado College of Mines and came to M.I.T. to take a master's degree, which he received in 1912 with us. He was engaged in mining all his life and was a well-known figure in the Colorado area.

Lewis Davis, who graduated with the Class of 1911 and took his master's degree with us in 1912 in chemistry, died in Worcester on February 7, 1959. After leaving the Institute he worked for the New Jersey State Laboratories and then spent seven years with Parke Davis in Detroit as a research biochemist. He later became laboratory director of B. B. Laboratories, St. Paul, Minn., and then went to Worcester to become chief at Brewer and Company. In 1923 he helped found the firm of Davis, Bennett, with whom he was associated until his death. He participated in civil and professional affairs and also was active in many scientific societies.

Harold Brackett of Oradell, N.J., was good enough to send me word of the death of Charles Bickerdike who passed away on January 1, 1960. Charles was with us only Freshman year and then went West to complete his college education. He worked for the Standard Oil Company of California for many years until he retired five years ago. He had been in very poor health for the past year.

Eric Kebbon writes that he is selling his large home in Stonington, Conn., and moving back to his old apartment in New York. The Kebbons found the summers very pleasant at Stonington but the winters were rather severe and long. . . . John M. Pettingell, who has been a manufacturer's agent for many years in Cambridge, has moved to the country. He would be delighted to hear from any of his old friends. You may reach him at R.F.D. South Acton, Mass.

Bernie Morash is good enough to write me frequently about his various activities and recently informed me that he is about to retire from his position as general manager of the Dudley Lock Company, in Toronto. He has had several mild strokes and thinks it is time to let up a bit. Good luck Bernie and do continue to write. . . . Bolmer Vaughan in New York said that they had two visits from Jennie White, Lester's widow, as she passed through the city on her way to and from Rome where she visited her daughter who is married to an American newspaper correspondent. Jennie is in good health and would be delighted to hear from any of her old friends at her home in Florida. — FREDERICK J. SHEPARD, JR., *Secretary*, 31 Chestnut Street, Boston 8, Mass.; JOHN NOYES, *Assistant Secretary*, 3326 Shore Crest Drive, Dallas 35, Texas.

'13

Time is marching on. Have you sent in your dues for the year of 1960? Are you planning to attend our interim re-

union in 1961? Your reunion committee is endeavoring to secure quarters on campus. Would you prefer to spend your reunion at one of our near motels? Frankie Achard and, we think, Charlie Thompson favor holding the reunion at the Publick House at Old Sturbridge, Mass. Your committee would appreciate hearing your views. So — do not delay — send in your vote today. No doubt you have already heard from Bill Mattson and Larry Hart about the Class of 1913 50th reunion gift. 1913 never comes in second.

Warren Glancy on a visit to Rochester, N.Y. (we assume to see his family or part of it), clipped the following from the *New York Times:* "Warren A. Gentner, chief engineer of the Metropolitan District Water Bureau, has been elected president of the New England Water Works Association. He has been chief engineer and deputy manager of the bureau since 1948. He is past president of the Connecticut Water Works Association." Well done, Warren. Looking forward to seeing you Alumni Day in June.

We have received a clipping from the *Holyoke Transcript* which describes the research conducted on hardwoods in recent years in southern areas, for the basic material for newsprint. Much credit should be given to our own George Richter, who was granted some 400 basic patents as he progressed toward a solution of this problem and for finding various other uses for wood cellulose. George gave valuable service to our country in both World Wars and after long association with the Brown Paper Company went to the Eastman Kodak Company. He is now retired and lives in Pittsford. Quite a record, George.

It was indeed refreshing to receive a letter from George Bakeman. Dr. Bakeman was well known by many of the governmental officials as well as many bigwigs in the Soviet and its satellites, when he served at various times from 1918 to 1947 with the American ambassador to Russia. He was in Moscow at the time of the revolution and the assassination of Czar Nicholas II and his family. His experiences with the State Department, American Red Cross, American Committee on Public Information in Russia and surrounding countries, as well as the Rockefeller Foundations, and other relief organizations were fruitful and very exciting.

For the past 18 years George has been associated with the Medical College of Virginia's School of Medicine as assistant dean, dean, personnel manager, student counselor, chairman of student loans and scholarships, and secretary for the board of visitors of the college. As of June 30, 1959, he retired to his farm, The Oaks, at Hanover, Va., but spends several days a week at the college and the remaining time with his eight grandchildren, farm work, and hobbies in his new workshop. George sends his best to all '13ers and states that he and his wife would like to greet any or all Tech men on their way north or south on Route 1 or Route 2. Well George you asked for it. I hope that I may be able to take advantage of your hospitality in the near future (1961).

It is with a very heavy heart that we must announce the death of another dear classmate, Holland Russell Wemple. He passed away December 27, 1959, at St. John's Hospital, Springfield, Ill., while visiting his old home town Waverly, Ill. He was a retired vice-president and director of the Texas Gulf Sulphur Company. Wemple was 67 years old and had resided at 40 Fifth Avenue, New York City. During World War I, he served as a lieutenant in the Chemical Warfare Service of the Army. Wemp is survived by his widow Margaret; two brothers, Jay and Clarence C., and a sister Edith. We of 1913 extend to his family our most heartfelt sympathy.

With deep regret we announce the death of Daniel M. Moore, 9 Warren Street, Taunton, Mass. Dan passed away on April 14, 1959 at the N.E. Deaconess Hospital, Boston, after an illness of nine weeks. To Mrs. Moore, we offer our condolences.

Bob Bonney has informed us and some of the members of our Alumni Association that he is very much opposed to the textbooks and teachings which are being fostered by some teachers of economics relating to "creeping inflation." We quote in part: "Inflation in this country preceded the panics of 1837, 1857, 1873, 1893, 1907, 1920, 1929, and 1937."

Well, dear classmates, here's hoping that you will write about your views of life, your activities, and your ideas for our next reunion in 1961. "Lest we forget" those $5.00 dues are now due. — GEORGE P. CAPEN, *Secretary and Treasurer,* 60 Everett Street, Canton, Mass.

'14

In the last issue of The Review your secretary asked that a classmate write if on a change of address he also had joined the great group of those retired. Many in the Class had expressed an interest in what retired members were doing. Word comes from Ralph Wells, who has been in South Pasadena for over a quarter of a century, that he has moved to Anaheim, about 30 miles farther south. Has he retired too, and what is he doing? Raising oranges?

Marriages are infrequently reported in these notes. We are, however, very happy to report the marriage on February 6, 1960, of our classmate, Harold T. Bent, to Mrs. Dorothy M. Lavery in Wellesley Hills, Mass. They will make their home at 314 67th Street, Newport News, Va. Harold had recently retired as vice-president of the Newport News Shipbuilding and Dry Dock Company, where he had also been works manager. He was responsible for some of the largest ships in our Navy.

It is with great sadness that we report the deaths of two of our classmates. The first was Charles Barstow Hull on January 20. For many years he had been employed as a buyer for Raymond's in Boston. He had retired to Boothbay Harbor, Maine. He is survived by his widow, the former Mildred H. Lawton, whom he married on May 27, 1914, and a son, Charles, Jr.

The second was Ernest L. O. Patten who died on February 8, 1960 in Bradenton, Fla., where he had recently retired. For many years he had been a mechanical engineer with the Western Electric Company and later with the Hotpoint division of the General Electric Company in Chicago. He married Madeline Kneeland in 1919. His first wife died and in 1941 he remarried. His second wife and a son survive him. Bob, as he was affectionately known, was one of a good sized-group from Malden, Mass., who entered M.I.T. in 1910. Harold L. Harlow, Gordon B. Greenough and Patten have already died. The others of the group were Thomas W. Sheehan, Ralph H. Perry, and Roy L. Parsell. Bob was one of our enthusiastic wireless operators in our undergraduate days. — CHARLES P. FISKE, *President,* Vista Sierra Lodge, 4801 East Broadway, Tucson, Ariz.; HAROLD B. RICHMOND, *Secretary,* 100 Memorial Drive, Cambridge 42, Mass.; HERMAN A. AFFEL, *Assistant Secretary, and Class Agent,* R.F.D. 2, Oakland, Maine.

'15

So, you're going to our class reunion! Wonderful! You'll see about 65 old friends and classmates there. Encouraging preliminary returns are coming in steadily. Snow Inn at Harwichport on Cape Cod is a delightful place, where we can all enjoy being together again. Return to Boston on Monday, visit M.I.T., and go to the class cocktail party, 4 to 6 P.M., at the M.I.T. Faculty Club. This is for everybody and guests — whether or not you were at the reunion. Plans are either to meet at 1915 headquarters at M.I.T. (room number to be announced later), where the transportation boys will take you in cars to the Cape, or to go directly to the Cape from your homes. The reunion on the Cape is *stag* and *informal.* After the class cocktail party, the Alumni Dinner at M.I.T. that evening will end a wonderful 45th reunion. It's getting late — will you be one of us?

George D. Whittle'08, I, a consulting engineer in Berkeley, Calif., sent us the following clipping on Mary Plummer Rice and added that it was a fitting tribute to her for her many hours of volunteer service in hospitals. From the San Francisco *Sunday Chronicle,* January 10, 1960: "Mrs. Julian Rice, a volunteer Pink Lady who has given 5000 hours of service to Marin General Hospital, was recently named 'Woman of the Day' by radio station KABL. Mrs. Rice was among the first volunteers when the hospital opened in 1952. Most of her service has been in the central supply section of the surgical department, where she rolls dressings. A graduate research chemist from the Massachusetts Institute of Technology, Mrs. Rice has worked in the Manhattan State Hospital, the mental and tuberculosis wards of the Montrose Veterans Hospital and in the tuberculosis ward and central supply of the Bronx Veterans Hospital. She has also worked for 10 years as a Red Cross Gray Lady at Letterman Hospital in San Francisco, working in the neuropsychiatric section." Congratulations to our Mary.

In January, Herb Anderson was operated on in a New York hospital for a detached retina — a delicate and sensitive eye condition. We've sent cards and notes to him and have written Alice. In Philadelphia Henry Daley, Sol Schneider and Ed Whiting have kept contact with Alice to check on Andy's condition and progress. At this writing he is doing well, recovering steadily but will be laid up a long time. We all join in hoping

and wishing all the best for Herb, a great guy in our Class.

Henry Daley wrote about the January class dinner in New York: "It was indeed a nice party — a good dinner plus preliminaries — a glorious opportunity to renew friendships with the gang. With possibly a couple of exceptions and these only trifling, time certainly hasn't shown its ravages with the two dozen or more present. You look in the pink yourself and as for that guy Pirate Rooney he's the youngest looking old buzzard (or your own synonym) in the Class. It's the liveliest looking group of around 67 years of age that you will find anywhere." Now, that's enough to make us all proud of our age.

No word yet from Ed and Anne Sullivan out there in the South Pacific at those storybook island ports on their "Bergensfjord" round the world cruise. How'd you like to see Ed at the reunion in a straw skirt? . . . Clive Lacy continues to add to his special gifts donors for the Alumni Fund to keep 1915 out front in this generous giving division. . . . At the January Alumni Council meeting, Phil Alger, from Schenectady, had as a guest Ole I. Franksen, a young graduate student from Copenhagen, whom Phil had met there last summer. He is a delightful young man, working on computers.

More Christmas card messages: Alice and Hen Berg didn't say so, but our spies report that they will be with us in June. . . . Jack Dalton will be there. . . . Charlie Williams calls me an old "reprobate" (he must have been watching). . . . Sam and Evelyn Berke are going to catch up with us in Boston. . . . Cynthia Blodgett was in Los Angeles last summer with her sons and continues her child care work in Bangor, Maine. . . . Helen and Otto Hilbert will spend February in Guatemala and March in Mexico. . . . Al and Anne Sampson wished us a "full glass, tummy, and stocking." . . . Hank and Virginia Marion will be at Belleair Beach and I hope they stay until Fran and I reach there in March to have a little reunion of our own with the Hiltons and Homans. Tess and Gabe have been saving cracked ice for our arrival. . . . Louie and Polly Young are enjoying retirement and wish all the rest of us the same. . . . Charlie and Bee Norton are bird watchers at Martha's Vineyard. . . . And Speed Swift, recovering from recent hospitalization, wrote from New London, N. H.: "You city slickers should be up here in the country. I am still leading a restricted life, trying to make up for lost time." Well, I don't think Speed has lost very much time over the past years.

George O. Eaton, VI, died November 24, 1959, after a long illness. Two years ago he retired and went to live in Newcastle, Maine. For 40 years he had been with the New England Electric System. The sympathy of our Class goes to his widow, Mrs. Frances L. Eaton. See you at the reunion. — Azel W. Mack, *Secretary*, 100 Memorial Drive, Cambridge 42, Mass.

'16

A glance through the 1959-1960 Alumni Association directory indicates a number of '16ers active in Alumni affairs. Joe Barker is the 1916 representative on the Alumni Council. Steve Berke is the council representative of the Miami M.I.T. club and Henry Shepard of the Panama club. As for class officers and class agent, most of you know the answers but it may refresh some memories if we repeat them: President, Ralph Fletcher; Vice-president and Special Gifts Chairman, Joe Barker; Secretary, Harold Dodge; Treasurer, Hovey Freeman; Class Historian, Walt Binger; and Class Agent, Bill Barrett. The 1916 executive committee includes, in addition to those just named, Steve Brophy, Jim Evans, Izzy Richmond, Steve Whitney, and Bob Wilson. Officers of M.I.T. clubs include Harmon E. Keyes as Secretary of the M.I.T. Club of Arizona; Al Lovenberg as Secretary of the M.I.T. Club of Connecticut Valley in Springfield; and Joel Connolly as Vice-president of the M.I.T. Club of Taiwan. As for the educational council of the Institute, Phil Baker is honorary secretary in the Detroit area, and Clint Carpenter is honorary secretary in the Norfolk-Newport News area in Norfolk. We have one Alumni representative on department visiting committees, and that is Joe Barker, as representative on the visiting committee of the Department of Modern Languages.

Vert Young, when writing about the African safari that he and his wife Sylvia took last summer, mentioned that he had never had a chance to study geology — a subject in which he had always been interested. So he took along three books — one on general geology, one on minerals and rocks, and one on the geomorphology of South Africa. He wrote: "Trying to cram three years study into 12 days produced a bit of mental indigestion but enough information stuck to add greatly to the interest of the trip, both in Africa and in Europe. I have now become a confirmed 'rock hound,' a most interesting hobby incidentally, only I have almost no time to devote to it!" In December we heard that he was out of the country on an extended business trip, but that even then he was continuing to pursue his new hobby. We look forward to hearing more about it.

We were glad to hear from Spotts McDowell who says: "I am still associated with Harbison-Walker Refractories Company, on a consulting basis. I have never married and live alone in the Webster Hall Hotel (Fifth Avenue, Pittsburgh)." Right now he's spending most of his time on a revision of the company's book *Modern Refractory Practice*. This is the fourth edition — he also worked on the three preceding editions which were published in 1929, 1940, and 1950. He says his only trips away from Pittsburgh in recent years have been short vacation trips to Florida. We have a beautiful folder of the Garber Research Center of Harbison-Walker, one that will be posted on the display board at the reunion in June, for it gives a fine picture of Spotts himself, with three others, under the caption, "Earl A. Garber, President, discusses new products with Raymond E. Birch, Director of Research, and with Harbison-Walker's long time research counselors, J. Spotts McDowell and William F. Rochow."

Larry Knowlton writes from retirement in Cumberland R.I.,: "Retired and live in what we call the country (most of the characteristics of city living except that we have a lot of space around us). Working as a common laborer out-of-doors on grass and flowers eight or nine months a year, and putter around inside the rest of the time. The year is broken up by a couple of trips to my daughter's in Wake Forest, N.C. (she has five children), occasional visits to my son on Long Island (he has three children), and usually we spend the month of September in Maine, and maybe take a trip to a warmer climate in the winter." Larry has a comfortable house in what they consider a good location in a friendly community.

A note from Don Webster states that although he, like his old Course X laboratory mate, Harry Lavine, asserts his unsuitability to teach chemistry to teen-agers, he does nevertheless feel qualified to teach sixth-graders the theory and practice of quahog digging. . . . Frank Ross reports from the west coast of Florida that he retired on July 1 and now spends summers in Hartford and winters in Naples, Fla., "golfing, swimming, and fishing." . . . Frank Hastie commented in January from his new address, Dowell, Md.: "Spring can't come too soon, what with our bulbs, azaleas, and dogwood here."

The February New York luncheon included Joe Barker, Art Caldwell, Harold Dodge, Jim Evans, Herb Mendelson, Stew Rowlett, and Bob Wilson. . . . Art Caldwell, who has been taking things quite easy since he retired late in 1957, came in bubbling over for he had gone back to work again, and once again as a vice-president. Since the first of the year he has been with Calvin Bullock, Ltd., of 1 Wall Street, as V.P. His bailiwick? The five mutual funds supervised by the company. . . . Joe Barker had stories to tell about trials and tribulations. Subject matter? The school board problems in New Rochelle. . . . Noted also was the fact that the specially designed luncheon invitation cards (created by Jim Evans) that have been used to build up the 1916 attendance, are now being given a market test by the Class of 1917. These two classes, when seated together, usually strain the capacity of the largest table of the club.

Bill Barrett was the subject of newspaper items on January 1 when he was promoted to vice-president and secretary of the Metropolitan Life Insurance Company as announced by Frederic W. Ecker, Metropolitan's board chairman. Since 1951 Bill has held the office of secretary. He has been with the company since 1923 and has been an officer since 1942. The Darien, Conn., *Review* added a few items: "He is a trustee of Old Sturbridge Village, Sturbridge, Mass., of the American Craftsmen's Council, and of the American Heritage Foundation. He formerly served, for many years, as an honorary secretary of M.I.T." Congratulations, Bill!

Ralph Davies retired on February 1 from the Aluminum Company of America in Pittsburgh, where he was vice-president in charge of sales since 1947. He recalls that he has not been very good in attending reunions, but reunion dates seemed to have a habit of conflicting with the annual meetings of the Aluminum Association at White Sulphur — occasions which he was more or less duty bound to attend. But, he says: "Maybe I will do better in the future.

The first thing I am going to do is to start for Florida on February 1 for a month at Hobe Sound. From then on nature can take its course. Just for the record, I have a married daughter in Cleveland and a married son in Cincinnati and seven grandchildren. When they are all here at one time it is quite a houseful. Maybe I can do better by you when I have more leisure although I gather from some friends who have retired that they keep very busy without doing very much."

Frank Darlington, who has been summering in Hyannisport and wintering in Leetsdale, Pa., for many years got down to his trusty typewriter ("trusty but fatally unattractive to me") in reply to requests for a word. Says our letter arrived as preparations for their return to winter headquarters commanded his attention — each year he thinks he's going to get home without having forgotten any indispensable item and each year when 30 or 40 miles on the way, the forgotten item swims into his horrified brain. Further: "Your nudge arrived as I prepared for a very rare event — Christmas away from home. Added to these distractions were the ever present (at this time of year especially) importunities of the various tax-gatherers, state and federal. Retirement may be an unmitigated bore to some, but I find it hard to locate enough time to do all the pressing day to day chores, let alone do the things that I have always had in the back of my mind. Of course, when I tell you that I am not only second in command, but my own bookkeeper, tax accountant, shipping and billing clerk for my little business in currentographs and correctocourses, stenographer, file clerk, office manager, handyman (do you know how often light bulbs have to be replaced in a modest establishment like mine? Neither do I, but at times it seems like one every minute, and the descriptions of the bulbs I buy say they will last a lifetime), tree surgeon, kitchen helper (on the maid's day out), even chef on occasion, fuse replacer (my Course VI training is invaluable in this activity), and all the other unskilled occupations that house, garage, tool shed, and seven acres of Dutch Elm disease demand attention from." This sounds pretty much like the life of a part-time consultant and half-time professor! Frank and his wife spent Christmas in New York with their son Edward R. (New York University '46) whose name appeared on the masthead of *Newsweek* magazine for the first time in the December 28 issue. Frank says his son, like father before him, is very happy at a job far from engineering.

We have an excellent picture of Ed Weissbach to post on the display board at the reunion in June. This is a Christmas circular of the Grace Episcopal Church in Merchantville, N.J., with a picture showing the Rev. Canon Albert W. Van Duser, Rector, the Rev. Edward A. Weissbach, Associate, and the Rev. Harry Hart, Curate, preparing a display for the Christmas season. In January, Ed expressed interest in the fact that Frank Hastie's son was so well regarded in his ministry in Roxbury. At that time Ed had just come back from a stay in Charleston, S.C. Says he's going abroad again — this time to Spain and Italy as well as to see the Oberammergau Passion Play. Since his wife died he hasn't wanted to go alone so he's joining a tour. He'll be going on the same line that Bob Wilson and Bill Barrett took. He says that with his family (daughter and grandsons) living down in Nashville, Tenn., there isn't much to keep him in New Jersey except his church activities.

We mentioned George Petit in the February issue and his specialty of business trend analysis. A precise example of his technique (not a "technic" but a real "technique") with due credit to George can be seen on page 17 of the December 17, 1959 issue of the *Engineering News-Record*. Here is given the E.N.R. current appraisal of materials price stability with two curves, the first showing "Materials Price Trend Loses Momentum — cement, lumber, structural steel (materials component of E.N.R. cost indexes)," and the second, "Momentum Net Change Curve — differences between highs and lows of 12-month moving averages by quarters measure momentum of the cost movement." As the E.N.R. says: "This method of predicting cost trends was developed by Mr. George H. Petit." Writing to Jim Evans regarding this publication, George says: "It is kind of a thrill to be recognized, even in a very minor degree in my 68th year. Don't forget that I am older than most '16ers, having passed into the U. S. Naval Academy when most of you, including that lovable bum, Ralph, were still in high school." He refers to Jim as his "desk-mate in Structures — Professor Spofford — remember?"

Dick Fellows writes from San Francisco where he is associated with General Cable Corporation. Looking back over the years, he notes that he has returned to the Institute only twice since 1916, first, during World War I, when he attended the Naval Aviation Ground School, and later, in 1922–1924, as a research assistant on some cable insulation studies. He went with the old Safety Cable Company in 1924, before it became a part of the General Cable Corporation and has been with them since. He has spent most of his time in the development and manufacture of high voltage cables. In 1943 he went to California as technical superintendent of the Emeryville plant. Since 1954 he has been the Pacific Coast district engineer covering all types of electric wires and cables. He's planning to retire in July but intends to do consulting on a part-time basis. He says: "We have a home in Clear Lake, about 100 miles north of San Francisco, and my wife and I expect to keep busy up there gardening, boating, and fishing. We are at Soda Bay, and would be glad to see any M.I.T. men who are in the vicinity. The weather is perfect there 10 months of the year, and we hope to travel during the other two months. We have two children, Rowland and Edith, and five grandchildren. Our daughter Edith is married to a construction engineer, Dick Kelley, who has his own consulting firm in Portland, Ore. They have three daughters, ranging in age from 12 to 17 years. Our son, Rowland, is an electrical engineer with IBM. He lives in Walnut Creek and has a son eight and a daughter six."

If interested in basic research, we suggest you write to Bob (R.E.) Wilson, 1500 Lake Shore Drive, Chicago 10, and ask him for a reprint copy of his paper "Support of Basic Research in Industry," which he presented in New York last May in the Caspary Auditorium of the Rockefeller Institute, at a Symposium on Basic Research, sponsored by the National Academy of Science, the American Association for the Advancement of Science, and the Alfred P. Sloan Foundation. Here is some very informative and substantial material, most interestingly written. Bob still rates a C (1916 system of grading) in English!

Sidney Dodd retired December 31 from active duty as chief chemist of Oakite Products, Inc., in New York City. We understand he had a long, active, and successful working career with Oakite. Like some of the other retirees, he will, we judge, now have more time to attend the 1916 monthly luncheons in New York. These luncheons are held on the Thursday following the first Monday of each month, in the rooms of the M.I.T. Club of New York in the Biltmore Hotel, close to Grand Central Station.

This concludes the 1916 news for the current issue. If you have noticed that the column is shorter than usual, guess why. To help keep the 1916 news ample and interesting, make your contribution by sending any and all kinds of pertinent information, even a bit of philosophy now and then, to — HAROLD F. DODGE, *Secretary*, 96 Briarcliff Road, Mountain Lakes, N.J.

'17

We begin this month's class notes with a letter from Thomas W. Ryan of Ferguson, Mo., who, as you will note from the following is full of vim and vigor: "As I have for many years, I once again survived the double jeopardy of my birthday and New Year's Eve on December 31. For many of those years, 20 to be exact, I was a bachelor in New York City. The wear and tear in retrospect now seems appalling. How fortunate I was to survive, marry a wonderful forebearing girl, and capture the doubtful distinction of becoming the father of the youngest son born to the Class of '17!!!!! We are blessed with three teen-age daughters, Barbara 18, Suzanne 16, Sharon 14, and two sons, Tom, Jr. 9, and our pride, joy, and master of the household, Kevin Barrett Ryan who will be four years old on February 5, 1960. With all due humility I ask, can any '17er top that?

"Autobiographically, from M.I.T. in May 1917 to 1st Officer's Training Camp, to Europe in September, and almost two years as a lieutenant with the 1st Engineers, 1st Division, A.E.F. Two classmates were in my regiment, the late Louis Wyman and our distinguished Dean Penn Brooks. I also remember meeting Tom Meloy in the front lines of the Toul Sector early in 1918. My only claim to fame was leading the first American raid on the German trenches — no prisoners — no medals — but a 10-day leave in Nice. Returning to the U.S. in June 1919, I spent the next 26 years with the Thompson-Starrett Company, in those days one of the largest building construction firms in the country. Its last notable building was the Waldorf Astoria in New York. Many fabulous and many not so fabulous years followed after which I got to be vice-president and director. The

major event, following my move to Chicago in 1939 to take charge of a $7 million housing job, was a trip to the altar with a very special person on February 21, 1941.

"Back to New York, and on March 20, 1942, en route to Jacksonville, Fla., to build a shipyard on the swampy banks of the St. Johns River. Our original contract, for which we formed an affiliate company, the St. Johns River Shipbuilding Company, was for 82 Liberty ships to be built as fast as the good Lord would permit. That was the year the Florida coast was lighted almost nightly by the fearsome flames of oil tankers torpedoed by the Nazis. In building this six-way shipyard even the smallest structure had to be supported on piles. Literally snatching the tracings off the engineers' drawing boards, we drove on April 28 the first of what finally totaled over 52,000 piles, 15 to 65 feet in length. Our eight gantry cranes could not be delivered in time so all of our first two, and most of our first six ships, were erected by means of crawler cranes. Some fun!

"While the yard was being built, we put hundreds of men through shipbuilding training courses which enabled us to build our work force to 16,000 as we went into the shipbuilding program. Working three shifts a day and seven days a week, we were able to launch our first Liberty on March 14, 1943, less than 11 months after we drove in the first pile. As Executive V.P., I was particularly pleased when we were able to beat the record of any other six-way shipyard. We were awarded a second contract to build tankers for the war in the Pacific and were well under way when the atomic bomb put a stop to legalized slaughter. The government later sold our shipyard to astute Louis Wolfson who made a fantastic profit selling the equipment, and this profit became the springboard of his mercurial climb.

"While most of us were head over heels in the war effort some others were busy maneuvering into control of well-known companies. One such got working control of Thompson-Starrett and before the war with Germany had come to an end he sold our shipbuilding company. I stayed on until the war with Japan came to its abrupt end. After some months as manager of the Philadelphia office of Frederick Snare Corporation, I purchased a half interest in a New England distributorship and spent 1947–1948 in Boston. These were two very enjoyable years, but competition proved too tough and so to Cleveland in 1949 as manager of operations for Basic Refractories, now Basic, Inc. In 1953 I accepted an offer to take over the management of the Alton Brick Company in St. Louis as vice-president and general manager. Here we expanded and modernized two brick plants and doubled production. A fine family owned company, it was a prime target for that seemingly large group who, in recent years, have made a business of buying and selling the assets of so many companies. In most instances Uncle Sam has contributed substantially through our tax laws. And so I am back with Basic, Inc., as division sales manager. Our company manufactures the well-known Tiger Brand building limes and is one of the national distributors for Owens-Corning Fiberglas and other building products. My job is the supervision of sales throughout seven southwestern states and a part of three others. My office is in Clayton, a suburb of St. Louis, and we live in Ferguson, another suburb.

"I'm enjoying my work immensely and looking forward to 1975 when our son Kevin will be entering M.I.T. Without a trace of envy, I send my best wishes to all my retired classmates."

Stanley Hyde writes from Punta Gorda, Fla.: "After 18 days in an attempt to regulate the timing of my 'pump,' they gave it up as a bad job. So armed with a letter to the southern medico, adequate electrocardiograms, a woefully restricted diet, and aided by a competent chauffeur for the Chevvy, Connie and I set out for Florida on December 14. My life has been pretty uneventful since October 1958, when for the first time since 1916, I became 'unemployed.' Last summer we rented cottages at the beach as usual, but my heart condition prevented my active management of the same. Punta Gorda has received publicity as 'the Sleeping Beauty that has at last awakened' in view of the Port Charlotte and other developments inspired by the outlanders from Miami.

"The seven years I spent at Hyde Windlass Company (no family relationship) were very satisfying ones as were the 20 years at North Yarmouth Academy under the presidency of the late William H. Rowe, a local druggist and an historian of national note who *understood* education. Occasionally I drive along the Caloosahatchee and think of the time when Doc Underwood gave a lecture on 'Where Oysters Grow on Trees' at the Pasteur Club. I never saw the Tamiami Trail until 1938 but, praise God, I did see it then when it was not too late, but NOW! WOW! April to November should find us at Popham, Maine, in our village house, but we hope that December to April will find us here, in Solana."

Alfred S. Niles writes from Stanford, Calif.: "Last October I reached age 65 and retired. I am now professor emeritus of aeronautical engineering at Stanford University, where I have been since 1927. Now that I am footloose, my wife and I are getting ready for about six months of travel in Europe. After that I'll probably settle down in Palo Alto and do a little writing and a lot of reading."

Notice has been received of the death of two 1917'ers. Paul N. Montague of Winston Salem, N.C., died in November 1959. . . . J. E. Doherty, formerly chief chemist for Lever Brothers Company, died on January 8 of this year at his home in Waban, Mass.

John M. DeBell gave an illustrated lecture entitled, "Glimpses into Russia" at Lowell Technological Institute on December 9. This lecture grew out of John's visit to Russia last year. . . . The Brush Beryllium Company, leading producers of unalloyed beryllium metal, announced on January 19, that C. Baldwin Sawyer, was named chairman of the executive committee. Mr. Baldwin was formerly chairman of the entire company.

For those who are called upon to make speeches frequently, the following anecdote may be worth thinking about: The speaker was droning on at intolerable length, and a man whispered to his neighbor, "What follows this speaker?" "I'm not sure, but I'd imagine tomorrow." —

W. I. McNEILL, *Secretary*, 107 Wood Pond Road, West Hartford 7, Conn.; STANLEY C. DUNNING, *Assistant Secretary*, 21 Washington Avenue, Cambridge 40, Mass.

'18

They say that in the spring a young man's fancy lightly turns to what the girls have been thinking about all the time. So, on this February evening this old man's fancy gladly turns to what you'll be reading for a few minutes. . . . Charlie Tavener, who came out of Mattapan, Mass., to conquer Course II, and whose son Junior conquered Course XV in 1945, received the citizenship award from the B'nai B'rith men and women of West Orange, N.J. . . . Johnny Clark, who survived the perils of Course VIII, and but a few years ago was raising cattle in Florida, has joined the faculty at the University of Mississippi. He reports: "Right glad I made the move. The life is not as healthy as punching cows, but it is much better to pit one's brains against a freshman, and perhaps I'm doing a little bit of good."

Moving at a measured professorial clip and turning my thoughts to these notes, I was able to overtake Ted Norton strolling down the long corridors of M.I.T. early in February. He is anticipating the International Ceramic Conference to be held in London next May, at which time he will deliver a paper on some erudite subject which has eluded me. Thence, he plans a trip to Greece in order to examine the old pottery there in the expectation of learning something of the methods which were used in the manufacture of vases when Pericles helped to prosecute Cimon on a bribery charge, and Socrates was misleading the youth of Athens. Ted also expects to run an appraising eye over some of the marble statues. He still lives on his farm in Gloucester, and still raises sheep, and Christmas trees. He has a flock of 20 sheep who relieve him of mowing the lawn (see Thorstein Veblen on this subject). Prying further into the excellence of the flock, we learned that there are currently no black sheep. Ted has a son who is executive secretary of the Boston Bar Association. The older daughter lives in Cincinnati, the younger in Old Greenwich, Conn. Brother John Norton also walks the M.I.T. corridors at just the right professorial speed, but lives in Cambridge, where he does his best to capture a bit of farm atmosphere by a greenhouse on the garage roof. One difference is his ability to think of spring all year around.

Up one flight and some offices toward the longitude of the big dome, I found Carlton Tucker slaving away on the Course VI budget for next year. He looks well, works hard, and budget wise pools his efforts with a capable secretary a lot closer to spring than any of us.

Courtesy of both Sax Fletcher and Gretchen, we have news that for Otto Lorenz the soft, warm air has come battling the cold frost for the last time. He died in Georgetown, Conn., January 25. Since 1953 Otto has been associate editor of *The American Banker*. Before joining the banking daily, he had been a consultant in the field of consumer credit, serving the

American Bankers Association, the former Consumer Bankers Association, and a number of private firms. He was an active member of the New York M.I.T. Club for years, though recently the long, slowly gathering twilight of cancer made it impossible. Lorenz was born in Scranton, Pa. He frequently lectured and wrote on consumer finance, and was an advocate of the charge-account plan of retail credit. Surviving are his wife, Anna Hill Lorenz; a daughter, Mrs. Robert Eaton, and three grandchildren.

Also, via a meager *New York Times* announcement comes word that Colonel Herbert B. Wheeler of Bradenton, Fla., has seen his last spring. He died on January 14. — F. ALEXANDER MAGOUN, *Secretary,* Jaffrey Center, N.H.

'19

Harold Marshall says that his retirement activities include being president of the South Jersey Chapter of the Reserve Officers' Association, and mayor of Palmyra, for a third term. . . . Charles Parsons keeps busy with his hobbies, in addition to his active association with the real estate firm, Louis Carrear, Inc., of New York. He is fond of swimming and sailing, and in the winter does a bit of amateur piano playing. He is one of the regulars at the 1919 luncheons of the New York M.I.T. Club.

Fred Griebel, design engineer with General Electric, in Lynn, Mass., has just retired after 23-years' service with the company. . . . Another General Electric employee who retired January 1 is Alfred Hough. Alfred had worked for the company for 37 years. For most of those years he was in Pittsfield, Mass., but since 1952 he had been manager of the capacitor department in Hudson Falls, N.Y.

The following members of 1919 belong to the M.I.T. Club of New York and attend our monthly class luncheons: Ray Bartlett; William H. Bassett; Charles Chayne; Oscar A. deLima; Edmund J. Flynn; Ralph Gilbert; John J. Hanson; Leo A. Kelley; Albert Mayer; Adolf Muller; Charles Parsons; Ellsworth Paterson; Philip Rhodes; Edgar Seifert; Eugene R. Smoley; James Strobridge; Alexis Wiren; Lester Wolfe. Luncheons are held on Friday of the first full week of each month at the club, Room 100, the Biltmore Hotel. — EUGENE R. SMOLEY, *Secretary,* 30 School Lane, Scarsdale, N. Y.

'20

Just think, in a couple of months we'll be gathering at Chatham Bars Inn. Things are shaping up for a gala reunion and all we can say at this time is that if you aren't among those present, you'll regret it for the rest of your life. The management of the Inn has gone all out to provide us with the best possible accommodations. So it is up to us to make the most of this opportunity.

Jim Carr has moved from Maplewood, N.J., to Virginia Beach. . . . Bill Finlay has moved from Kirkwood, Mo., to Estes Park, Colo. . . . Bill Nelson is in Menlo Park, Calif.

In this time of mergers, an interesting one is that of Phi Kappa and Theta Kappa Phi under the new name of Phi Kappa Theta and headed up by national president Pete Lavedan. — HAROLD BUGBEE, *Secretary,* 7 Dartmouth Street, Winchester, Mass.

'21

"Ay Caramba! Qué paranda tecnologica y tequila-ógica con energía atómica y todo! Tell you all about it on our return from the Class of 1921 reunion in Mexico at the Fiesta of the M.I.T. Club of Mexico City." Written on an attractive card, picturing the M.I.T. beaver (plus sombrero and slide rule) astride a burro plodding his way through typical Mexican countryside, this is the substance of numerous messages which have been winging northwards from a happy group of '21ers and wives who are down Mexico way for our second record-breaking interim reunion far from the Great White City on the Charles. The lead time necessary to meet The Review's rigorous production schedule may delay the recording of this unusual event in these columns for another month or two.

Ollie Bardes and Harry Goodman indicated their intention to be present at the reunion in Mexico since publication of last month's list of probable attenders. Also, a fine letter arrived from Jim Parsons, saying he was spending the winter in various Florida spots and was then going to the West Indies, returning along the Gulf coast to New Orleans. He added that he planned to be in Mexico for our reunion and Chick Dubé rushed details to him via air mail to Tobago, B.W.I., as Jim requested. Jim sent regards to his many friends in the Class.

In the course of several phone calls and letters from Ray St. Laurent on class affairs, he advised that Bob Moore and George Pollock had written that they would attend our BIG 40th reunion during the M.I.T. centennial observance in 1961. While in New York City, Ray talked with Dan Harvey and William Thompson Smith. In Boston, he met Mich Bawden. . . . Edward R. Schwarz, Professor of Mechanical Engineering and Head of the Division of Textile Technology at the Institute, is the author of an interesting article in the February issue of The Review, entitled "Staying Ahead in Textiles," a review of the history and current activities of Technology's educational trend from the design of machines to basic research. Ed has been a member of the M.I.T. staff since 1922 and has won wide recognition for his numerous contributions to the advancement of the textile art.

Joseph L. Gillson says his new home address is 109 Mullin Road, Hilltop Manor, Wilmington 3, Del. . . . Walter A. McKim can now be reached at his new home on Lake Woahink, Florence, Ore. . . . Samuel E. Moreton, Jr., receives mail in care of Box 537, Brookhaven, Miss. . . . William B. Plummer reports he has left New York City for southern climes and gives P.O. Box 4875, Pensacola, Fla., as his address. Maxine and your secretary were in Boston at the end of January for the delightful Simmons College commencement exercises for the eight graduates of the physical therapy program. Our daughter Eleanor received the bachelor's degree in science and the diploma in physical therapy. Long interested in working with crippled children, she has accepted an appointment on the staff of the Mary Free Bed Guild Children's Hospital and Orthopedic Center in Grand Rapids, Mich. Our son, Alfred, is still a division manager with Sears, Roebuck in New York. While in Boston, we talked with Ted Steffian and Chick Dubé but missed contacting Mel Jenney and Chick Kurth.

Dug Jackson sent a clipping from the Baltimore *Sun,* quoting the fictitious *Purple Termite,* ". . . the snobby little alumni bulletin . . . from Arbuckle State Teachers College," whose satirical class notes are in the ratio of four business tycoons to one ordinary mortal who made the news because he got a six-point buck in the deer season! Says Dug: "We found this amusing and thought you might also. There is some truth in the thought, too. It is much easier to get news of people who are in the public eye and so are 'newsworthy.' Perhaps an issue once in a while devoted entirely to 'Joe Doaks' would be appreciated and enjoyed by the Class." We continue to send out questionnaires to the entire Class every few years and run all the news we get, without slanting it towards any particular group. It would greatly assist class officers and committeemen if everyone would complete and return the questionnaire sent out last fall — for planning future class activities, correcting class and M.I.T. records and for supplying these columns with adequate news for all our classmates.

Many of the Class are active in Alumni affairs, as reported in the annual directory of the Alumni Association. Here they are, in the order of their appearance in this publication: Chick Kurth is our class representative on the Alumni Council. Representatives of local Alumni clubs include Jack Barriger for the Pittsburgh club; Mich Bawden, Cleveland; George Chutter, Northern New Jersey; Josh Crosby, Bangor; Frank Kittredge, Monterrey, Mexico; Ace Rood, Indianapolis. The class officers are: Ray St. Laurent, President; Cac Clarke, Secretary-Treasurer; Ted Steffian, Assistant Secretary; Ed Farrand and Larc Randall, Class Agents; Bob Miller, Photo-Historian; Warrie Norton, Chairman of 50-year gift; Irv Jakobson, Chairman of leadership gifts; Mich Bawden, Chairman of special gifts; and Mel Jenney, Chairman of 40th reunion.

On the departmental visiting committees are: Fred Adams, Chemistry; Norborne Rawlings and Andy McKee, Naval Architecture and Marine Engineering; Bob Moore, Economics and Social Sciences; and Joe Gillson, Earth Sciences. Officers of local clubs include: Helier Rodríguez, Review Secretary, M.I.T. Club of Cuba; Joe Wenick, Treasurer, M.I.T. Club of Northern New Jersey; and Palmer Scott, Vice-president, Technology Club of New Bedford.

Honorary secretaries and educational counselors include Sam Lunden, California; Ray St. Laurent, Connecticut; Ed Farrand, Georgia; Harry Field, Hawaii; Cac Clarke, Sumner Hayward and Joe

Wenick, New Jersey; Irv Jakobson and George Welch, New York; Ray Snow, North Carolina; Wally Adams, Ohio; Si Freese, Texas; Gene Rudow, Washington; George Pollock, Wisconsin; Helier Rodríguez, Cuba. Warrie Norton is a past president of the Alumni Association. Staten Island, N.Y., (the Borough of Richmond) is the only spot in the U.S.A. which is denied representation among the 10 electoral districts of the Alumni Association!

Lester F. Rhodes has been associated with Parsons, Brinckerhoff, Hall and MacDonald since 1952 in various projects, including flood control, mass transportation, fabricating plants, sewer systems, and defense installations. Following his graduation from West Point and subsequently with us in Course I, he was a professor of mathematics at the Military Academy and professor of military science at Clarkson College of Technology. He served in the Corps of Engineers for 30 years, attaining the rank of colonel. He headed a number of engineer districts in this country and abroad and received the Legion of Merit award for wartime assignments, including the responsible charge of engineer operation in the Southwest Pacific. Following his retirement, he was on the administrative staff of the Garden State Parkway in New Jersey and in charge of the development of technical equipment for the P. R. Mallory Company. He contributed the chapter on airports for the textbook on *Modern Airmanship*.

Saul M. Silverstein spoke on "Handling Grievances and Dealing with Unions," before the Franklin County Industrial Management Club in Greenfield, Mass. Saul's many business activities now include directorships in the Orchard Paper Company and the Newington Hospital for Crippled Children.

Reminders for action: Please answer the January letter from Ed Farrand and Larc Randall by returning the card with your pledge for our 40th reunion gift to the Amity Fund. Please complete and return the class questionnaire to your secretary — additional copies are available on request if you can't locate yours. Please schedule Alumni Day, June 13, 1960, for our next 1921 gathering on campus in Cambridge and also June, 1961, for our BIG 40th reunion and plan to attend them both. — CAROLE A. CLARKE, *Secretary*, Components Division, International Telephone and Telegraph Corporation, 100 Kingsland Road, Clifton, N.J.; EDWIN T. STEFFIAN, *Assistant Secretary*, Edwin T. Steffian, Architect, 11 Beacon Street, Boston 8, Mass.

'22

Clate Grover has forwarded a clipping from the *Seattle Post-Intelligencer*, listing among the living builders of Seattle, H. W. McCurdy, shipbuilder following a family tradition, by stating that his family has been in the shipbuilding business "forever." We quote: "McCurdy is proud, with considerable reason, of his family. His grandfather started building ships at Seabeck and Port Gamble in 1857, just five years after a tiny village named Seattle sprouted forth on the eastern shore of Puget Sound. 'Grandfather came to Port Townsend in 1857 via the Isthmus of Panama,' he said. 'And grandmother — they weren't married then, she was only three years old — came to Washington Territory in 1853 over the Oregon Trail. It has been said of the settlers of the Pacific northwest that the timid never started and the weak never got here. I'm proud of my ancestry. It had a strong stain.' "

"McCurdy reflects his family's 'strong strain.' At 60, he looks like a member of the Husky football squad. He was born in Port Townsend and at the age of 12 he began spending his summers and weekends in his uncle's shipyard there. 'I began learning the business by sweeping out bilges and painting seams for him,' McCurdy said. 'I remember his warning me not to leave any holidays (missing spots) when I was sweeping. It was good advice, for you can't do any job well by leaving holidays. I still heed his warning.' McCurdy became a shipbuilder because he 'was raised in a seaport town and had salt water in my blood.'

"His son, James G. McCurdy is president of Puget Sound Bridge and Dry Dock Company. For the past 38 years, McCurdy has been with the Seattle firm known as Puget Sound Bridge and Dredging Company until last year when controling interest was purchased by Lockheed Aircraft Corporation. McCurdy said he has 'no particular plans for retirement. What time I have left, I'll spend it on Puget Sound, though.' he said. 'This is my part of the country and if I've added anything to it, I'm very happy.' " Our class is very proud of Horace.

Our president, Parke Appel, with his energetic committee, is working on our 40th reunion meeting place for June 7-10, 1962. The Weekapaug Inn is being considered. Looking toward that time, Don Carpenter, Parke, and our special gifts group are being most helpful concerning certain tax advantages for the donors providing the greatest gift at a minimum of net cost. Don's talk before a small group in New York has been printed and is available as a most constructive explanation of our objectives.

Jack Teeter, Executive Director of the Damon Runyon Memorial Fund for Cancer Research, 730 Fifth Avenue, New York 19, has written thanks to your secretary for the theater ticket business. Our thanks go to his organization for help in obtaining very good seats.

George Dandrow has forwarded the following note regarding the loss of Marion, charming wife of Larry Davis of Scarsdale: "As I understand from Larry's report, Marion had been taken ill while visiting some of her friends at the club. She was taken to the hospital and some time later she had a more severe follow-up of what had been a minor stroke. From the report, I understand there had been a massive cerebral hemorrhage and Marion passed away. Many of our classmates had an opportunity at the time of the M.I.T. Club of New York Annual Dinner and Silver Stein Award to have a visit with Larry and Marion, at which time they both appeared to be in fine spirits. It was a great shock and loss, not only to our classmates but to so many people, actually throughout the world where Marion had traveled with Larry and where she was held with very great affection." Our sympathy goes to Larry at this time.

Fred Dillon has also written of the death in January of Othneil G. Williams, (Ham), of Winsted, Conn. We will miss him from our usual class gatherings. . . . The sympathy of the Class is also extended to the families of William M. Perry of Helena, Mont., and Robert M. Littlefield of Holliston, Mass. — WHITWORTH FERGUSON, *Secretary*, 333 Ellicott Street, Buffalo, N.Y.; C. GEORGE DANDROW, *Assistant Secretary*, Johns-Manville Corporation, 22 East 40th Street, New York 16, N.Y.

'23

Robert C. Sprague, Chairman and Treasurer of Sprague Electric Company of North Adams, Mass., has been reappointed chairman of the board of the Federal Reserve Bank of Boston for 1960.

Hugh A. Corr, Department of Public Works district engineer, has been presented a 25-year pin by the American Association of State Highway Engineers. The presentation was made by state D.P.W. Commissioner Anthony DiNatale. Corr appeared in a recent cover photo of the *New England Construction* magazine. The picture was of Corr and Dean Amidon, field engineer in charge of the Longmeadow-Springfield section of Route 91. Corr was named district engineer here in July after serving for several years in various capacities in the local office. The district serves Franklin, Hampshire, and Hampden Counties. Prior to his appointment as district engineer he had served since January, 1958, as construction engineer inspecting interstate Route 91 work. He was also maintenance engineer from 1948 to 1958.

Corr, 59, is a native of Cambridge and was graduated in 1923 from M.I.T., the same year he joined the D.P.W. He has worked on numerous engineering design jobs for the D.P.W., both in western Massachusetts and the eastern part of the state. A resident of West Springfield since 1934, his engineering jobs include the Saugus River lift bridge, the Revere-Lynn bridge, Morton Street overpass in Boston, five bridges in connection with construction of the Worcester Turnpike, the Sunderland Bridge in 1937, and restoration of the Mohawk Trail following the 1938 flood. He was field engineer in charge of the W.P.A.'s $2,000,000 stream clearance project in 1940, and other work has included the highway on Riverdale Road, West Springfield, the Agawam-West Springfield Bridge in 1944 and assistant district construction supervisor from 1945 to 1948.

The coveted Richards award of the American Institute of Mining, Milling and Petroleum Engineers was presented to Norman L. Weiss on February 17 at the American Institute of Mechanical Engineers' annual banquet in New York City. Norman is chief milling engineer for the western division, American Smelting and Refining Company in Salt Lake City. A.I.M.E. said the honor goes to the Salt Laker "for his contributions to minerals engineering and in particular for his development and application of differential flotation and cyanidation to complex base and precious metal ores; his outstanding

work in mill design; his formulae for extraction and efficiency determinations; his contributions to the profession as an author of technical papers, and for his qualities of leadership, integrity, and devotion and his never failing willingness to help and inspire his fellow men, both professionally and personally." Congratulations to you Norman!

A note from George Bricker includes news concerning himself and Harry Green. Relative to himself he says: "In addition to working with a few clients as a counselor to top management, I have continued to follow developments in the field of university-sponsored executive development programs, which I have been doing for the last eight years. In January the *Michigan Business Review* published an article of mine on the subject, and Prentice-Hall issued a digest of such programs which I compiled. Grandchildren now number five." His note from Harry Green reads as follows: "I resigned as president of Brandeis, Goldschmidt and Company, Inc., as of December 31, after having been associated with them for 22 years. Following this, I formed a new company, H. Green and Company, Inc., 61 Broadway, New York 6, N.Y., to engage in business as international merchants of nonferrous metals — this is the field I have been following since 1925. My son, Michael, Class of '52, has joined me in this new enterprise."

We also have a bit of news about our genial assistant secretary, Al Redway. He writes as follows: "The middle of October I resigned as president of Rockbestos Wire and Cable as I felt I had done all I could for the company. Now that they are part of Gerro de Pasco I was excess baggage. I fully intended to loaf for a year but John Cairns, President of the Stanley Works in New Britain, persuaded me to take a staff position with his company and work on long range planning. So I gave in and started the new job February 1. Will still live here in Hamden."

The following address changes have been reported: Arthur R. Stuckey, 872 Liggett Boulevard, Crestwood 26, Mo.; Lester B. Bridaham, 330 Humboldt Street, Denver 18, Colo.; Rear Adm. Richard M. Watt, Jr., Kaiser Aircraft and Electronics Division, Kaiser Center, 300 Lakeside Drive, Oakland 12, Calif.; Roscoe H. Smith, 21775 Parnell Road, Shaker Heights 22, Ohio; and G. Wilbur Seymour, 5000 North 33rd Street, Arlington, Va. — HERBERT L. HAYDEN, *Secretary*, E. I. du Pont de Nemours and Company, Leominster, Mass.; ALBERT S. REDWAY, *Assistant Secretary*, 47 Deepwood Drive, Hamden 17, Conn.

'24

This month is going to start on a sorry note indeed. Two of the most active members of the Class, Bill Robinson and Frank O'Neil, passed away within one 24-hour period early in February. Bill was in Boston, presumably on business. He was a passenger in a car returning from the North Shore late on a Friday night when a four-car crash occurred, and Bill was killed. We have no details of how the accident happened, but it was a very foggy night.

The following day Frank died of a coronary in Mobile, Ala. You will remember he had a very serious attack a year ago, and decided after Christmas that Chicago winters were a bit hard to take and went south. He was at an Alumni Association meeting in Chicago last October and was in fine spirits then, but in the south he had another attack and, after two weeks in an infirmary, died. To Patty Robinson and Dolly O'Neil and their families go the heartfelt sympathy of all of us.

The February meeting of our New York contingent was held three days after that tragic weekend. It was a rather subdued affair. There were 21 at the Christmas meeting, but the numbers shrank to seven in February: Paul Cardinal, Bill Correale, Dick Lassiter, Nate Schooler, Henry Tanck, Warren Hill and Ed Wininger.

Hank Simonds had a lengthy letter from Professor Emilio del Prado. Maybe you remember that the del Prados were the ones who tied the Cardinals for the class progeny record at eight. Their grandchild score now stands at 18! Del had a stroke three years ago. He still feels the effects. He has two farms, one a poultry farm, the other with pineapple, corn, and rice. His oldest daughter is married to a U.S. Air Force captain and living in Florida and one son is in the U.S. Navy.

Griff Crafts reports some very interesting news. This spring keep an eye on your local movies and when you see that a picture called "I Passed For White" is playing nearby, don't miss it. Betty and Griff are both in it! "I had always nourished a secret hope that I would act once again before I shuffled off this mortal coil. Every Sunday I put 25 cents in the collection plate and offered a prayer and, believe it or not, my prayers were rewarded." They went to the coast in October, worked like the devil from before sunrise to after sunset, took a rest at Palm Springs, and were back home by Thanksgiving. "Once an actor, always a ham," says Griff. "Now they can hand me off to the glue works." One point he didn't mention was whether or not he had been cast in a part that allowed him to retain those lengthy moustaches.

New Hampshire Ball Bearings in Peterborough is noted for its production of miniature bearings, some only a thousandth of an inch in diameter. People with the kind of experience needed for such work are rare, so the company started a school last year to train them. It's a one-year course, and its head is the company director of education, Sid Doyle. Haven't heard of Sid in years, but never expected him to turn up as an educator.

Seamco Chemical of Holyoke, Mass., has just completed a six-fold plant expansion. Seamco was started four years ago by E. Robert Derby to make polystyrene for the plastics industry. Bob started with A. D. Little, then went to Fiberloid and Monsanto before starting his own business. May confuse you a bit, but Seamco is a division of Kraloy Plastic Pipe which is a subsidiary of Rexall Drug. Bob is president of Seamco and V.P. of Kraloy, but don't know whether or not his relation to Rexall is any more than that of a customer.

Willard C. Blaisdell has a changed title and therefore, presumably, different duties. He was manager of sales and service, Bludworth Marine Division, Kearfott Company, Division of General Precision, Inc. All that's in New Jersey. Now he's director of marine instrument sales of Kearfott.

In January the *Times* told in some detail of a new study of approach accidents at airports being made by the Flight Safety Foundation. It is sponsored by several companies as well as the Air Line Pilots Association, and it is being directed by Otto E. Kirchner, "Boeing scientist."

Had a very pleasant visit from Andrew P. Kellogg in February. Andy has taken up photography as a hobby, and we toured photo shops looking for equipment which didn't seem to exist. He expected at the time to give his cameras a workout at the big Mexican Fiesta in March. . . . Another visitor was Royce Greatwood accompanied by one of his Japanese business associates. They roamed around the Institute looking up all manner of things, from textiles to isotopes. Royce is going back to Japan this spring on another lengthy business trip.

Tony Rosado has evidently left Havana. At least he has a new address at the International Telephone and Telegraph Company in New York. . . . And Johnnie Fitch must have taken up a new assignment. He's been in Brazil ever since going to South America, but now he's crossed the Andes and is with Cia Chilena de Electricidad, Ltd., in Santiago, Chile. . . . And the winter would not be complete without a card from the Henningers from some warm spot. This latest came from Daytona Beach: "Balmy and like June here, and also where we were on Palm Beach and Miami shores. The nights are like neon fairylands."

So much for now, and certainly hope I can start off next month on a happier note. Till then. — HENRY B. KANE, *Secretary*, Room 1-272, M.I.T.

'25

Just as these notes are in preparation, a note from Tom Price brings the shocking news that Glen Bateman died during the latter part of January. There is no further information available at this time; and rather than endeavor to put together a tribute on short notice of which the first president of our Class is certainly deserving, it must be postponed for one month. The assistance of Don Henderson on this matter is being requested, since he knew Glen well.

Word has come of the passing of Clarence B. Lober who died in Prescott, Ariz., on December 18, 1959.

All of you will remember Frank O'Neil of Chicago who, although a member of the Class of 1924, had many friends in '25 and endeavored to join us at our reunions. He was present for a part of our 30th; and when I saw him at the Alumni Officers' Conference in Chicago last October, he reminded me that he was looking forward to joining us at our 35th reunion in June, 1960. He will not make it because he died suddenly on February 6, 1960.

There are matters in a happier vein, although the news this month is somewhat skimpy. Chink Drew has come through with further information giving us the exact titles of Payson Hammond and Wade Johnson who are with Goodyear at Akron, Ohio. Payson is senior tire design engineer, and Wade is manager, tire testing. . . . Another one of the many 1925 M.I.T. Alumni Chink meets quite often is John Hoxie who is a prominent patent attorney with the company of Davis, Hoxie and Faithfull (George Faithfull of the Class of 1926).

A recent issue of the *Boston Herald* had a fine picture of Ralph Gow on the financial page, noting that he is executive vice-president of the Norton Company and has just recently been elected to the board of directors of the United Fruit Company. . . . Of particular interest among the address changes noted during the past month is one for Tod DeFoe who appears to have moved his headquarters from Spain to Forchstrasse #10, Feldmeiler, Zurich, Switzerland.

As a final note, please remember that the time to the reunion in Chatham, Mass., is drawing close. If you have not already registered or let us know you are coming, please take the few minutes required and send word. — F. L. FOSTER, *Secretary,* Room 5-105, M.I.T.

'26

This is February 14 in Pigeon Cove and true to form we are having our New England St. Valentine's storm. Last night's radio predicted the worst storm of the year. Therefore, when I was awakened at 4 A.M. with a sleet staccato on the easterly windows, I pulled the blanket up over my ears so I would not hear it. I visualized at least a foot of snow by breakfast time (as predicted) and being marooned here for a couple of days with only bacon and eggs in the refrigerator. The 7 A.M. broadcast, however, predicts a change to rain by noon so I can now relax and write class notes. The sea is really wild and roaring out there and it's nice to be facing the glowing fireplace with St. Bernard, Heidi, at my feet.

How fortunate, therefore, that your secretary has a wealth of notes for a change. It's unfortunate, though, that we must start with two items of sadness. A note and clipping from Ken Lord brings the first. Ken's note reads: "It is far more interesting to read of the escapades of our classmates to the far corners of the earth than to read of deaths and I regret that I must report Frank Washburn's death. His work with labor unions, for his company, had him traveling over the U.S.A. He went to the Doylestown, Pa., hospital on December 21 with coronary occlusion and was recovering to the point of going home, but died that day, January 10." Quoting from the clipping: "In 1957 he was appointed labor relations co-ordinator for Combusion Engineering, Inc., 2 Penn Center Plaza. He negotiated labor agreements on a nationwide basis, often acting as joint chairman for industry and labor representatives. He was a member of the American Society of Mechanical Engineers, the Bucks County Chapters of Professional Engineers and the M.I.T. Club of Philadelphia. He was a Mason. Surviving is his wife, the former Camille Egner."

The other item was clipped from the Hartford, Conn., *Courant* on January 15 and mailed to us by Jack Larkin: "Mrs. Louis J. Darmstadt of Norwich was killed Thursday when her car crashed into an abutment on the Connecticut Turnpike here. Mrs. Darmstadt, about 48, was alone in the car when it crashed. Police said the auto apparently went out of control because of a flat tire. Your secretary extends sympathy from the Class to Mrs. Washburn and to classmate, Louis.

On the brighter side, we have our annual annoying letter from the Denver renegade, Ben Howe. The guy just delights in rubbing it in while I sit through a St. Valentine's Day storm. His current address is El Rancho Santa Elena, Guadalajara, Mexico. Here's his letter: "I'm looking forward to our 35th reunion. Where will it be? We bought a new 28 foot Traveleze trailer last September, rented our house and moved in it. It got awful cold some nights because I could not get away from my business in Denver until November 15. My wife and I plan to live in the trailer from now on — it's the 'Gypsy Blood.' Had no trouble pulling it here (1,800 miles) with my '57 Olds wagon. This trailer court is a beautiful spot. It is eliptically shaped with 30 trailers all facing the center where there is a long fish pond encircled by a road. Each trailer has a patio surrounded by flowers in bloom. Lots of shrubbery, orange and banana trees. Temperature is 70° to 78°F. during days and in 50's at night. We left our trailer here and drove to Manzanillo December 15 and stayed three days. Saw the results of the terrible hurricane they had in October. We had been there for six winter vacations and I keep a boat there. Most of the beautiful cocoanut palms are smashed and all the light poles are destroyed. All bridges were out the last 70 miles and we had to cross one *big* river by driving on a narrow railroad trestle. As soon as they get electricity out to the beach where we stay we shall drive our trailer there for the balance of the winter."

Ben has asked about our 35th reunion and it would be a good question coming from anyone except Ben. Why should a fellow who brings his house with him care? But it's still a good question and the answer is that the Boston '26 nucleus which organizes reunions is having a luncheon this coming week to start the wheels rolling. By next month we shall have a preliminary report. Also, next month we shall give you reports from George Breck and Walter Lobo. Man, what a feeling to finish an issue of class notes and know that you have something to start with next time. When are *you* going to send us a report? Please make it soon. Best till then. — GEORGE WARREN SMITH, *Secretary,* c/o E. I. du Pont de Nemours and Company, Inc., 140 Federal Street, Boston, Mass.

'27

A distinguished honor was awarded John A. Herlihy on December 27 when United Air Lines christened one of its huge planes the "Mainliner John A. Herlihy." Dedication ceremonies were held at the San Francisco International Airport at the United Air Lines engineering and maintenance base, and Mrs. Helen W. Herlihy, his wife, performed the christening ceremony of the $5,000,000 plane by drawing back an American flag on the fuselage to reveal the inscription "Mainliner John A. Herlihy." A special guest was his mother, Mrs. Maud Herlihy, who flew to California from New York as the guest of United Air Lines. Spectators at the ceremony received a program paying tribute to Jack and summarizing his career as follows: "Student, engineer, Navy pilot, airline pilot, and senior vice-president of engineering and maintenance, those are some of the steps taken by him in progressing to his post as jet expert for United Air Lines."

Another interesting item of news concerning Jack appeared in a recent newspaper article which outlined a talk he gave before the Yale Engineering Association on the subject of supersonic jets. He mentioned that heat, pressure, and cost are barriers to the use of these jets and that it will be at least the early 1970's before operation of passenger lines at three times the speed of sound becomes feasible. He pointed out that at this speed the skin temperature on a plane would be 570 degrees Fahrenheit, requiring complete refrigeration to maintain passenger comfort, and that loss of any pressurization at necessary altitudes of 50,000 to 60,000 feet would be fatal. As to the money barrier, he said the current investment by the air lines of $1,500,000,000 or more to re-equip with the current family of jets, leaves management doubtful of early ability to finance development and purchase of the supersonics. He placed cost of developing such a plane at possibly $1,000,000,000 compared with $300,000,000 for a Douglas DC-8 transport.

We still have not succeeded in nailing down Oyster Harbors for our 35th reunion in 1962, but the project is being worked on strenuously by Bob Bonnar. — J. S. HARRIS, *Secretary,* Shell Oil Company, 50 West 50th Street, New York 20, N.Y.

'28

On the way home from a recent business trip your assistant secretary had the pleasure of meeting Slim Maeser and chatting with him during the final leg of a plane trip. Slim had only recently returned from a month-long trip through Europe and was still very enthusiastic over his experience. As president of the American Leather Chemists Association, Slim was the American delegate at a nine-day meeting in Munich, Germany, of the International Union of Leather Chemist Societies. His trip took him to Shannon, Ireland; Paris and Lyons in France; Geneva and Zurich, Switzerland; Frankfurt, Germany; Copenhagen, Denmark; then through Sweden, England, Ireland, and back home. Slim is research engineer for the United Shoe Machinery Corporation, where he has been responsible for a number of important technical developments. The patents to his credit make a long and impressive list.

Jim Donovan's correspondence in the special gifts department of the Alumni Fund drive is still bringing in welcome bits of news. Following are some briefs: Gertrude and Napp LaCroix wrote from Tokyo. They are planning to be back here in June when their younger daughter Jacqueline graduates from Barnard. . . . Marjorie and Bill Bendz are living in Los Altos, Calif. . . . Mary and Max Parshall had such a good time at the 30th reunion that they are already looking forward to the 35th. . . . Jo and Wes Walters are still living in St. Paul, Minn., where the winters are real.

Bill Hurst stopped in Boston while on his way to Paris and the Sahara Desert where he is apparently going to do some work involving petroleum reservoir engineering. He had lunch with Bill Donovan, and reports that Bill is looking well and is as pleasant and quiet as always.

We regret to report that B. M. Putich died in June, 1959, after a long illness. The information was received from Don Fraser in Pittsburgh, who learned of it through Bill Archibald. — GEORGE I. CHATFIELD, *Secretary*, 11 Winfield Avenue, Harrison, N. Y.; WALTER J. SMITH, *Assistant Secretary*, 15 Acorn Park, Cambridge, Mass.

'29

News is rather hard to come by even after missing last month's issue entirely.

A word from Middletown, Ohio, that Charley and Lucille Denny's son, Jack, was married on February 27 to Barbara June Graff in Middletown. This is the first of Charley's two boys to be married. Congratulations, Jack.

A notice in the local press that Francis J. Powers, who received his master's in 1929, died suddenly at Cranford, N.J., on December 20. Francis had been with Esso Standard Oil Company since 1929, and since 1955 had been division head of utilities, distillation, and chemical products at the Bayonne plant. In 1934 he was placed on loan assignment as a process engineer to open a new refinery in Port Jerome, France.

Also through the Alumni Office notification that Robert A. Marr, Jr., died in Virginia in March of last year — no other details. — FISHER HILLS, *Assistant Secretary*, 62 Whittemore Avenue, Cambridge 40, Mass.

'30

By way of a newsclipping from the *Herald News*, Fall River, Mass., we have learned that our classmate, Worthen Taylor, has been appointed chief engineer and director of the division of sanitary engineering in the Department of Public Health. Worthen entered that department as a senior sanitary engineering aid in 1938. His new position calls for direct supervision in the fields of stream pollution control, industrial waste material disposal, the handling and disposal of radioactive materials, water supply, environmental sanitation, and research projects at the Lawrence Experiment Station. Worthen has one son and two grandchildren.

An item from the Washington State Institute of Technology indicates that Ray Binder joined their industrial research staff on September 1, 1959. He will spend most of his time on research with the institute's industrial research division in the areas of fluid mechanics, hydraulic machinery, and vibration studies. In addition, he will devote part of his time to teaching undergraduate and graduate courses in fluid mechanics and other subjects. After receiving his Ph.D. in mechanical engineering and aeronautics in 1936, Ray moved to Purdue University, where he was professor of mechanical engineering at the time of his resignation from that post last summer. He is a prolific writer, and is noted for his four books on fluid mechanics which have become recognized as being among the foremost publications on that subject. He is also author of more than 30 papers on various research programs.

Tom DeMarco has been appointed technical service manager, record materials, for Monsanto Chemical Company's plastics division at Springfield, after serving as manager of the division's industrial and building applications group there.

It was good to hear recently from George Perry. After graduation, he spent 20 years (mostly in South America) in the telephone business and in mining. He says he is now, regrettably, about as far away from engineering as possible — working in property management. He has two daughters, one married with two children, and the other a 1959 graduate from Grinnell. His activities he lists as the usual — business, church, and some civic. His interests — hi-fi, sports cars, and golf, although now handicapped by poor vision. He is now recovering from a second cataract operation. About the only classmate he ever sees is Bob Clyne. George has little hope of attending our 30th reunion, although he certainly would like to. It goes without saying that we hope he can make it!

We had a note from Bill Paine recently. He is president of the Bendix-Westinghouse Automotive Air Brake Company in Elyria, Ohio. This company has only two stockholders, the Bendix Aviation Corporation in Detroit, 51 per cent, and the Westinghouse Air Brake Company in Pittsburgh, 49 per cent. His company has four plants in the U.S. and a 50 per cent owned subsidiary in Campinas, Brazil. Their main product is air brake systems for commercial vehicles. Three years ago the company entered the air conditioning and refrigeration field. Bill travels quite a bit, but, unfortunately, the closest he ever gets to Boston is New York City. He hopes that conditions will permit him to attend the 30th reunion. So do we, Bill.

John Moriaty sent us a note from Port Arthur, Texas. He says he started with Bell Labs, New York City, in 1930, but the depression caught him in 1933, at which time he kicked around and then settled with Gulf Oil Corporation in June of 1935. He has been at the Port Arthur refinery since that time except for a tour of army duty from 1941 through 1946, two years of which were unpleasantly spent in New Guinea and the Philippines. The Port Arthur refinery is one of the largest in the world. John's present title is senior engineering specialist. He has served as chairman of the Beaumont section of the American Institute of Electrical Engineers (1958) and is currently serving on the American Petroleum Institute committee on electrical equipment, the refining sub-committee of the A.I.E.E. petroleum industry committee, and the program committee of Texas University's annual power conference. He is also a member of the Seawall and Port committees of the Chamber of Commerce. He finds time now and then to go hunting and fishing. His son John David is enrolled as a freshman (engineering) at Texas University. To quote John: "I have a lovely 10-year-old daughter, Gail, and a beautiful blonde wife, Etta, who is a native Texan." John says she still refers to him as a damnyankee (pronounced as one word).

In thumbing through the directory of the M.I.T. Alumni Association, I came upon the names of some of our classmates and thought you might like to be informed of the positions they hold in the Association: Alumni representatives on departmental visiting committees — Civil and Sanitary Engineering, Al Waidelich; Chemistry, Joe Stevens and E. Ralph Rowzee; Humanities, Jack Latham. Associates of the Council — Greg Smith. Officers of M.I.T. clubs — M.I.T. Club of Akron, Ohio, Jim Holden, Treasurer. Council representative of M.I.T. clubs — Columbus, Jack Latham; Guatemala, Herm Scott; Albuquerque, Myron Smith.

The 30th reunion committee has been meeting frequently to formulate the final plans for our big weekend, June 10-12, 1960, at the Oyster Harbors Club. From the interest already shown by our classmates, this weekend should be a huge success. If any of you have not sent in your post cards requesting further information on the reunion, be sure to do so immediately. — GEORGE P. WADSWORTH, *Secretary*, Room 2-367, M.I.T.; RALPH W. PETERS, *Assistant Secretary*, 249 Hollywood Avenue, Rochester, N. Y.; LOUISE HALL, *Assistant Secretary*, 6636 College Station, Durham, N. C.

'31

The January newsletter of the Packaging Institute reports that Wally Tibbets has been advanced to the chairmanship of their technical co-ordinating board. Wally is assistant director of the development department of Union Carbide Plastics Company. . . . By this time, most of you have undoubtedly read that Jim Fisk, President of Bell Laboratories, was again named to serve as chairman of a group of U. S. scientists to participate in nuclear test talks with Soviet scientists. In addition to his career at Bell Labs, Dr. Fisk has also served as Director of research of the Atomic Energy Commission for two years. During that time he was the Gordon McKay Professor of Applied Physics at Harvard University. He is currently a member of the President's Science Advisory Committee and of the General Advisory Committee of the Atomic Energy Commission.

Word from the Institute tells that John R. Outt has moved from Philadelphia. His new address is c/o the General Electric Company, Room 204 Atlantic Building, Syracuse, N.Y. — EDWIN S. WORDEN, *Secretary*, 9 Murvon Court, Westport, Conn.; GORDON A. SPEEDIE, *Assistant Secretary*, 90 Falmouth Road, Arlington 74, Mass.

'32

Tom Sears, XV, told me that he had a very interesting group of eight members of the Class of 1932 attend the January meeting of the Alumni Council. They were: George Kerisher, XVI, Herbert Ross, XV, G. Edward Nealand, V, Robert E. Minot, IV, Jim Smith, VI-A, Elwood Schafer, VI, and Bill Pearce, VI-A. This was almost a small reunion. We usually have had these gatherings at the annual mid-winter meeting of the greater Boston Alumni, but the latter was canceled this year. Tom emphasized, just as this column has emphasized before, that similar Alumni groups should get together in other areas of the country in order to keep up the class spirit.

Bob Semple, X, addressed the Boston Society of Security Analysts early in February on the financial management of the Wyandotte Chemical Company. He and Tom had a chance to discuss various class problems, particularly the need for continued and increasing contributions to the Alumni Fund and preliminary discussions for our 1962 reunion. I missed seeing Bob because I was at the University of California serving as a visiting professor in sanitary engineering on the Berkeley campus for a couple of weeks. The San Francisco Alumni club invited me to address them at a luncheon meeting where I told them about our studies on radioactive wastes disposal and also saw some of my former students from that area.

Frank M. Ikuno, VI, writes from Monterey, Calif., that he has retired after many years in the Army and is now "coasting" along with a local roof and tile specialist on the development of an oriental roof for that area. His last duty was as assistant post engineer at Fort Ord, Calif., and his residence now is 20 Ralston Drive in Monterey.

Art Marshall, XV, of Springfield, Mass., has recently been appointed to the labor committee, administrative law section of the American Bar Association. Art is one of the two New Englanders serving on this committee. He has made a specialty of the field of labor relations and governmental regulatory laws. . . . Harry Krutter, VIII, who is chief scientist of the U.S. Naval Air Development Center in Johnsville, Pa., has been honored by being named a Fellow of the Institute of Radio Engineers. — ROLF ELIASSEN, *Secretary*, Room 1-138, M.I.T.

'33

Every class has its spark plugs. Relax, we are not going to start a vigorous discussion about compact cars nor engines in the rear (where some seem to be whether they should be or not). We speak with pride of one of '33's chief spark plugs, Ed Goodridge, VI, who has just become president of the M.I.T. Club of New York. Without stirring up competition, the New York club is one of the key M.I.T. groups in the country. Ed is eminently qualified; in short, Ed is terrific!

Speaking of spark plugs, there's another one to whom we point with pride and to whom we owe public apology. Last month we took Warren Henderson, II, to task by implication for peeling off some of his livestock and turning to boats. Yes, Warren does have a dog. But seriously, when Warren and Ed Goodridge team up on an enterprise, all heck breaks loose for the good of the Class.

In the category of little known facts about well-known classmates, is the story of O. Lindley Shurtleff, XV, who is now with Laird, Bissell and Meeds in New York as manager of the division of fund management companies. You know all about mutual funds; Lynn is the expert in the companies that manage mutual funds. He wrote an interesting article on these activities in the July 1959 issue of *Investment Dealers' Digest*. Lynn was a partner in Hayden, Stone for several years before taking his present post.

Our wandering mate, Ellis Littmann, XV, is back in the U.S. after his Far East trip. In seeking directions in Hong Kong, he found himself talking with a young native who wants to come to M.I.T. Ellis just can't get away from Tech business, and this is all to the good. . . . Speaking of traveling '33ers, Bill Barbour, VI, is on an around-the-world tour; Bill reported from Hong Kong in January about the heart-warming greeting he and his wife received from the M.I.T. Club there. We expect a full report on Bill's trip after he returns. One further note of interest from across the seas: Hank Backenstoss'34 reports on his interesting meeting with Emile Bustani, I, contractor, statesman and man of many talents.

We record with deep regret the death of Max Gene Nohl in an automobile accident in Hope, Ark., on February 6. Gene's wife was also killed. Gene was well known in our student days for his keen interest in deep-sea diving, a hobby which became his profession. Based in Milwaukee, Gene had a national reputation in this field.

In the press: Harrison Jewett, VI, recently accepted one of the key positions associated with the new planetarium at Mystic Seaport near Westerly, R.I. Harrison has had the principal responsibility for the construction of the planetarium which will serve college and high school students, as a scientific classroom, as well as the public. . . . Francis B. Vaugham, X, has transferred to the development department at DuPont from the planning division of the polychemicals division.

Here are the address changes, cryptically reported for lack of detail (come on, men, give us the story behind the moves): Courtenay D. Marshall, X, from Woodville, Texas, to Barbados, B. W. I.; Richard E. Payzant, I, from South Easton, Mass., to Topeka, Kansas; Thomas J. Slattery, IV, from Cranford, N.J., to Snyder, N.Y.; and Captain Allen M. Zollars, XIII-A, from Edwardsville, Ill., to San Luis Obispo, Calif.

Welcome news from familiar names and faces: Harry Summer, XV, writes that the Lerner Shops have adopted computers for merchandising as well as accounting and inventory control. Harry invites free advice on the upbringing of teen-agers: please write Harry direct! . . . Charlie Bell, XV, the busiest retired guy we ever saw, turned up for a short but most pleasant visit the other day, looking younger in every respect. The term "retired" is clearly a misnomer because he manages businesses all the way south to Florida, consults on research and development, and has some patent applications in process.

Happy spring. Stop by when you get near Cambridge. — R. M. KIMBALL, *Secretary*, Room 3-234, M.I.T., Cambridge 39, Mass.

'34

I've always admired Mal Stevens as being a young-looking and energetic fellow. Did you get the same impression on reading Mal's class notes in the March issue? He started off those notes referring to the kidding he gets around Cambridge "for being the only member of the class with four secretaries." Having lived so long in South America, I thought only in terms of what our auditor there told me about a man's three ages: He has 100 years of experience, 47 calendar years, and 18 years "de corazon" — his heart is but 18 years old. All I could think of was Mal in his fine office with four secretaries sitting on his knees. I visualized the amount of kidding he got, but not how he kept his job. Then I came to and realized that I was one of those secretaries. Next month would be my turn to write the class notes. So here goes.

From Lebanon, Hank Backenstoss wrote Mal Stevens a long, stimulating letter. Here is a part of his letter: "Things have settled down a bit for us. Our living arrangements are well under control. We have found out the intricacies of doing many of the things which are performed in strange new ways in this part of the world. Beirut is a crossroads for Western and Eastern cultures. It is January as I write this and we are in the middle of our 'rainy season,' yet I wish we had enjoyed weather like this for our 25th reunion! The sun is streaming across my desk. My shift to Lebanon to take on a new post at the School of Engineering of the American University of Beirut has provided us with many new and exciting experiences. Although my professorship in power technology is strictly in the academic field and I have administrative responsibilities in the school, a very vital side interest to me is exploring the possibility of utilizing American engineering know-how as an aid to area development.

"The university has a student body of about 2500 of whom 350 are in the School of Engineering. The school is relatively new, but the university is nearly as old as M.I.T., having been founded in the 1860's by missionaries, as the Syrian Protestant College. It would be hard to find a more influential or respected American institution in the Middle East. Its graduates are found in important government and busi-

ness positions throughout all these countries. These countries have varied customs, of course, so the students coming from them contribute a cosmopolitan atmosphere to the campus.

"There are many signs of great age here. Along the coast to Tripoli on the north, men still evaporate salt by the sun's heat in shallow beds among the coastal rocks. The water is lifted from the sea by windmill. At Byblos, ancient port, one can see ruins of dwellings going back as far as 5000 years! This town was a center for the export of wood from which paper was made, thus giving its name for the word 'bible.' Habitation appears to have been continuous over the ages, including even a fortified Crusader castle of the 11th and 12th centuries. Not far from there, at the Dog river, the mountains come to the sea. There, carved in the stone are tablets marking the passage of conquering armies as far back as Ramses II. And many things have not changed much since the early days — there are still the olive groves and the women carrying jugs of water on their shoulders or heads.

"Modern things exist side by side with the ancient and unchanged. Some of them show the effects of having arrived *too* fast — they are quite imperfect. Utilities are not reliable. We have not, after four months, been able to have a phone installed. Even if we had one, the central exchange is often overloaded. In Dhahran all telephone service ceases at noon when the operators go out to pray. But the people of an area are its most important feature. Those we have met are warm, hospitable, and vitally interested in what is going on here and in other parts of the world. They are definitely aligned with the West in their thinking and actions. Being at the crossroads of the Middle East, Beirut is inhabited by a large foreign population, both Westerners and peoples from other lands of the Middle East. While we have met those from both groups we have made a special effort to become acquainted with the latter and find it is most rewarding. Their hospitality is legendary and we can hardly hope to equal it.

"To be impartial one must report also that there are things here which are definitely not appetizing. Among beggars on the street are undernourished, oldish looking boys and girls who can't be more than 8 to 10 years old. They are usually barefoot and wear tattered dirty clothes. Their faces have a practiced begging look which is certainly erosive of self-respect. Women with small babies also beg on the street, and I have been approached by some even while the infant is at the breast. Child labor is everywhere. Even for adults, wages for unskilled occupations are barely enough to permit meeting essential living expenses. Consequently it is difficult for a person to escape the vicious cycle of economic poverty. To do so almost requires, as a first step, a speaking knowledge of English or French. Many, in fact, practically all of the upper class speak these languages in addition to Arabic. They can thus enter the employ of many European and American firms which have established branches or agencies here.

"I have written much in this letter, but there is a great wealth of subject matter I have not even touched. For example, I have not said anything about my encounter with Nadia Gamal, the renowned and very chic belly-dancer here. I mention it now to insure that Ed Nowell will rush to read all future class notes! If any of you get out this way, I will not hear of your passing without stopping in. Or if you write, I'll do my best to answer."

Dave Inglass wrote from the plane approaching New Delhi, the halfway point on his trip around the world. A few days before he had dinner twice with Hank and Nicole. Dave's guide not only knew Hank, but had been to their house for dinner. Dave says that Hank, as head of the mechanical engineering school, plans to stay a minimum of two years and by that time it will be a much better engineering school. Hank is doing a wonderful job, Dave says, and loves his work. After leaving Beirut, Dave and his wife went on to Teheran. They cut their visit short because of a pending Iranian airline strike. They got the last plane out of Teheran, but four hours later were forced down because of engine trouble in Zaheders, Iran. (This town is so small that I cannot find it in my atlas to check the spelling — Ed.) Due to the strike no plane would come and pick them up. Had they been able to get a car, they could have driven out of this no-man's land, in three days. But being a no-man's land, there were no cars available. He ends his letter with: "We lived like gypsies and lived and ate in mud huts for four days when we finally arranged with the American ambassador in Teheran to pick us up in an airplane and bring us back to Teheran."

Jean Raymond wrote from Lachine, Quebec: "It is unfortunately true that Vincent Rother died at the end of November. He had been ill for six months, caught with that dreadful disease, cancer. He was very successful as an architect, and recently formed a partnership with John Bland, who is the dean of architecture at McGill, and Trudeau, who is a graduate of Harvard University. Other news of classmates that may be of interest: Claude Beaubien is vice-president of the Aluminum Company of Canada and is in charge of public relations." Jean goes on to say that the two companies he formed about 10 years ago, for engineering and manufacturing, are bursting with activity. They are moving to new quarters with three times the space and much better facilities for handling and processing.

Walt Wrigley has written a book, with John Havorka, staff physicist at M.I.T., entitled *Fire Control Principles*. Knowing Walt and McGraw-Hill, we can be sure its 133 pages are well packed with vital information resulting from Walt's love of teaching and of his work. . . . I saw Sam Joroff recently. He told me of some of his problems as deputy director for planning for the world's capital. Yes, New York is the financial center, the political center (U.N.) and the fine arts and fashion center, to mention but a few. Sam has his troubles making an amended and muchly recommended 1916 zoning law fit present day needs. He's working on a jet age law to replace the horse and buggy one. He wants the subways improved so that people will use them and not depend on automobiles that clog traffic. He also hopes that large companies will stagger their hours so subways can carry more total traffic. He's deep in the work of the proposed first New York urban industrial park that will cover 100 acres in Brooklyn, not to mention the task of solving the Washington Wholesale Market problem in lower Manhattan. Another problem is that being a city employee, he is forced to live within the five boroughs. . . . Sam says that Red West has shifted to missile research in his work with Lockheed in California. . . . George McCaulley is a top engineer and architect for DuPont and is consequently active in getting contracts for their new construction. With his M.S. in architectural engineering and his winning personality, we can be sure DuPont's new buildings are top notch.

Rudy Churchill has just returned from a four weeks' business trip to Japan for W. T. Grant. He visited the major manufacturing and trade centers and found everyone working like beavers and reflecting much Western influence. Rudy found living and traveling there very easy and enjoyable, on a par with the U.S.A. The people are dedicated to peace; they don't want any part of defensive agreements with other countries and they don't talk about atom bombs. Tradewise, the Japanese government is limiting the quantity of exports to our country, so that protective tariffs will not be raised. They are also insisting on higher quality so that Japanese goods will be more in demand. Rudy sees Japan's desire to enter new fields and to do much original engineering. Of interest is the law which prohibits a business from being controlled by foreigners. Thus Monsanto's plant is less than 50 per cent Monsanto's. Rudy ran into one world-traveling Swede, as well as others, who insisted that Russia will lead the world in pure science because the Soviets can spend lots of money on such research. In our system we usually spend money only on technology, where it pays off. Rudy didn't wait to see Dave Ingalls arrive in Japan. Oh well, these world travelers will have to let it go for another day. — JAMES EDER, *Secretary*, 1 Lockwood Road, Riverside, Conn.; other *secretaries:* HAROLD E. THAYER, 415 West Jackson Road, Webster Groves 19, Mo.; G. K. CROSBY, Longwood Road, Huntington, W. Va.; M. S. STEVENS, Room 20B-131, M.I.T.

'35

The new Dedham plaza shopping center in Dedham, Mass., was designed by Roy F. Cicchetti who previously had done the Marlboro Industrial Park and Marlboro shopping center. Roy was chief architect at Camp Edwards during World War II and later served as special consultant for the Port of Boston Authority. . . . I recently received a note from Walter P. Green, Jr., from his new home at 29 Riley Drive, East Providence, R. I. Walter has returned to New England as chief chemist for the Industrial Dyestuff Corporation of East Providence after 11½ years with the Masonite Corporation of Laurel, Miss.

William H. Muller was recently made head of 15 sections of Fore River shipyard's drafting department. In heading up the hull division, Bill will follow some

internationally known maritime greats, but I am sure he will keep Fore River on top of the heap. . . . Edgar J. Staff was promoted to assistant director of health, environmental health services, which includes the division of laboratories, division of sanitary engineering, and the division of food and drug control. Edgar, who is with the Rhode Island State Health Department, was formerly chief of the division of laboratories. His present address is 345 State Office Building, Providence, R. I. . . . Joseph M. Colby, formerly deputy commanding general, U.S. Army Ordnance Missile Command at Redstone Arsenal, Alabama, has been named vice-president of engineering for Rockwell Manufacturing Company.

As I am writing these notes, information about our reunion and the questionnaire for the Class are being mailed. By the time this issue is published, the deadline for the questionnaire will have arrived. So as you read this, if you haven't sent in your questionnaire, please stop reading right now and fill it out. Hanow is anxious to do a good job on the book. Please make it possible for him to do so by getting your questionnaire in. Let's make this reunion the biggest ever. We have had particularly good groups at our previous reunions and it looks like now we might break all records. So sign up. — FRANCIS W. MULDOWNEY, *Secretary,* 1109 Boylston Street, Chestnut Hill, Mass.

'36

The reaction to our letter to classmates, asking for opinions, workers, and class dues, in preparation for the preliminary planning of our 25th reunion, was a huge success. The news is so good that we must put it at the top of the list. A quick count shows that better than 100 returned the questionnaire and many volunteered to help make the 25th the greatest reunion to date. As for the dues sent in, at present (mid-February) they total almost $500. By the time these notes are published it will undoubtedly be considerably more. Be sure you are not one of the few left out. Please send us your preference as to where and what type of a reunion you want — do it now! Also it would be nice if you would back up your choice with a small contribution to the class dues. The thrifty classmates will probably take advantage of crediting it against reunion costs when they are finally established. Remember June 1961 is closer than you think.

Now for some other news: Gerard Chapman has been appointed area chairman for the county campaign for the Boy Scouts of America. Gerard is a paper technologist at the P. J. Schweitzer Division of Kimberly-Clark Corporation. Also, the Chapman family operates a fiction syndicate, a magazine agency, and a book ordering business in Great Barrington where they live with their four children. Gerard has been active for the past two years in the Girl Scout fund drives. He is a member of the vestry at St. James' Episcopal Church, and a delegate of the Great Barrington Kennel Club.

Bob Gillette, President of the Rock of Ages Corporation, Barre, Vt., has been elected to the corporation of the Cordigan Mountain School at Canaan, N.H., at the annual meeting of the corporation and board of trustees. . . . Also up in the north country, Doug Cairns keeps active in the political field by engaging in a debate on the subject of the future of Vermont. (After a look at the census figures they had better do something soon or only the cattle will be registered.)

Francis Peterson, an industrial relations assistant at the Texas Research Center, Beacon, N.Y., has been transferred to Experiment, Inc., Richmond, Va. As proposal editor for the firm, a subsidiary of Texas Inc., he will supervise the preparation and issuance of proposals for government contracts.

A few changes of address: Rev. Claxton Monro is now at 2028 Dunstan Road, Houston 5, Texas; Carl White has moved to Hamden, Conn.; Lea Spring's new address is Box 415, Crookston, Minn.; Mark A. Princi can be reached at 1358 Rowe Road, Schenectady 9, N.Y.; Lewis Gelbert is at 118 Addington Road, Brookline 46, Mass.; Dick Halloran is in Wayland, Mass., at 169 Plain Road; Webster Francis has moved to 6 Green Ridge Road, Pittsford, N.Y. . . . Please don't forget to send in the 25th reunion questionnaire and the class dues. — JIM LEARY, *Secretary,* Indian Harbor, Greenwich, Conn.

'37

At the last Alumni Council meeting in Cambridge, the class of 1937 was represented by Phil Peters, Tom Kinraide, and Bob Thorson as regular members, with John Nugent and Tom O'Brien as guests. . . . Tom Kinraide is now associated with A. W. Banister Company, Cambridge, Mass. They specialize in dust control, fume control, and material handling problems. Tom is married and he and his wife Claudia have a son, Tom, who is a senior in high school and a daughter, Claudia, who is a sophomore in high school. The Kinraides ski as their family sport and Tom is very interested in the Boy Scouts. . . . John Nugent is assistant director of the Instrumentation Laboratory of M.I.T. He is working on the guidance system for the Polaris Fleet Ballastic Missile. The M.I.T. Instrumentation Laboratory has the prime contract on the guidance development for the Polaris. Recent newspaper reports said that the guidance system developed and built at the M.I.T. laboratory proved excellent on the first fully guided flight of over 900 miles of the Polaris Missile.

Tom O'Brien is with Jackson and Moreland in Boston. He is married and he and his wife Helen have one child. The O'Briens live at 73 Fuller Brook Road, Wellesley, Mass. . . . Walt Wojtczak recently was a member of a panel in a discussion on "The Search For and Development of Responsibility," held in Hartford, Conn. He represented M.I.T. on the panel, consisting also of representatives of Dartmouth College, Brandeis University, and the University of Pennsylvania. . . . Ollie Pike is plant manager of the tape division of the Shuford Mills, Hickory, N.C. He was recently appointed chairman-elect of the technical and specifications committee of the pressure sensitive tape council.

Jim McLean has joined General Dynamics Corporation as president of its Stromberg-Carlson Division. He is also a senior vice-president of General Dynamics and a member of the corporation's board of management. Jim was formerly president of the Hoffman Laboratories Division of Hoffman Electronics Corporation in Los Angeles. Previous to his association with Hoffman Electronics, he had been for 10 years with the Philco Corporation where he served as commercial manager of Station WPTZ-TV in Philadelphia, and as vice-president and general manager of Philco's government and industrial division. Prior to joining Philco, Jim had been with the General Electric Company for 10 years as a development engineer and a sales manager. He is a director of the Western Electronic Manufacturers Association and of the Armed Forces Communication and Electronics Association. He is also chairman of the western branch of the military products division of the Electronics Industry Association and a national vice-president of the National Security Industrial Association. He is a member of the Society of Motion Picture and Television Engineers, American Rocket Society, and American Ordance Association. Jim formerly lived in Bel Air, Calif., with his wife and four children — Susan, Marcia, Bill, and David. He has recently moved to Rochester, N.Y., the headquarters of Stromberg-Carlson Division of General Dynamics.

Heard from Norm Birch that his son Eric won a National Merit Scholarship and is now attending Harvard. . . . Joe Heal is the scoutmaster of his troop in Hingham, Mass., and is active with the civic chorus and church choir in his town. He says that the class gift program is steadily progressing, but a spurt will be needed in the last half, in order to reach our goal. — ROBERT H. THORSON, *Secretary,* 506 Riverside Avenue, Medford, Mass.; S. CURTIS POWELL, *Assistant Secretary,* Room 5-323, M.I.T., Cambridge, Mass.; JEROME E. SALNY, *Assistant Secretary,* Egbert Hill, Morristown, N.J.

'38

A rare event is a report on one of the women in our Class. This month we have an item from the DuPont employee magazine telling of Jeanne Kitenplon Buxbaum. Jeanne works in the organic chemicals division's Jackson Laboratory. She is currently involved in control methods for dye manufacture. Earlier she studied physical properties of urethane foams and in 1956 delivered a paper on the subject before a meeting of the American Chemical Society. . . . Another notable event is the marriage of Eugene Hochman to Ruth Phylis Haase of Brighton. The Hochmans will live in Van Nuys, Calif.

A news release indicates that Homer Oldfield, Vice-president of Raytheon's government equipment division, has been elected to a newly created post of group vice-president of electronic components and devices. . . . Another item reports

that Major General August Schomburg has been appointed by the Army to head its missile command. . . . Arthur Gould spoke at a meeting of the American Society of Tool Engineers on "Present and Future Requirements in Tool Engineering." He is head of the industrial engineering department at Lehigh University. . . . Another of our professors, Ascher Shapiro, has recently published a book, *The Dynamics and Thermodynamics of Compressible Fluid Flow.* — DAVID E. ACKER, *Secretary*, Arthur D. Little, Inc., 35 Acorn Park, Cambridge 40, Mass.

'39

Here's the detail promised last month about Captain Fred Cooke's current Navy assignment. Fred wrote: "My job is the planning and construction of facilities for the Pacific missile range. All of the missile and satellite work in the Pacific Ocean is of concern to us and requires facilities of all descriptions for its support. It is a fast moving business, and the most interesting I've been involved in. Reason I couldn't make the reunion was that I was on standby for a site survey trip to the South Pacific." For those of you who would like to jot a line to Fred and Eugenie, their new address is 1007 Polaris Drive, Point Mugu, Calif. The Cookes have four daughters: Kathleen, Lucy, Gina, and Laurie; Laurie, the youngest, is now three and a half.

From the other side of the continent comes news from Bill and Adie Pulver, at Lakeville, Conn. Bill is trustee of the local hospital, an active job. And he manages to sell enough Buicks, Chevrolets, Jaguars, Opels, and Triumphs to pay the bills of an energetic and happy family. He says: "Adie is secretary-clerk of the high school board of education, which has permitted her to taper off on some of the multitude of other civic chores which inevitably come to those who willingly serve with broad and uncomplaining shoulders. Pat, 17, slim and sophisticated, will be heading for college in the fall. Pat is a competent skier, so her choice will be a northern college. She is an energetic young lady, having organized and conducted a swim-day camp for youngsters this past summer, and plans to continue this activity in coming summers.

"Fred Pulver, 14, has a scholarship to Hotchkiss, where he has to work like a Trojan to get passing marks — and loves it. All that Freddy in interested in — when home — is swimming, diving, sailing, fishing, tropical fish, rocketry, radio building, saxophones, rock 'n' roll, bird feeding, and insect study. (He's really hard up for things to do!)" Joy, just 13, sounds like another adorable teen-ager from Bill's and Adie's letter, with the usual assortment of activities occupying her busy young life.

How many of you have been following the activities of Francis W. Sargent? Sarge graduated with us as an architect, but his life's work so far has been in the field of helping architect peoples' recreational activities. To be more specific, Sarge has just concluded a period of public service as Massachusetts Commissioner of Natural Resources, and has gone to Washington to serve as executive director of the O.R.R.R.C. Those initials need explaining, of course, to most of us. They stand for the "Outdoor Recreation Resources Review Commission," a Congressional-appointed group whose assignment is to study the country's mounting recreational needs and make recommendations to Congress on how to meet those needs.

Sargent, a fabled sportsman and conservationist in his own right, is dedicated to the fair and practical methods of opening private lands to the public's recreational needs. He is looking ahead to 1975 and 2000, when the population will be booming and when demands on present public and private recreational areas will be enormous. According to Sargent, private enterprise is the key to the problem. He feels that there are several ways of handling the challenge. Incidentally, Sargent was recipient of the Massachusetts Trustees' annual award for distinguished service in the field of conservation.

I assume that nobody reads these notes. Or else nobody can write. At least, with the exception of the Pulvers and the Cookes, nobody has come forth with any news for this month. Stop blushing about the progress you've made, and drop me a paragraph. I don't want to rely all the time on M.I.T.'s excellent news clipping service. — OSWALD STEWART, *Secretary*, 31 Birch Road, Darien, Conn.

'40

The U.S. mails did not come through this month. Accordingly, the only news is the 20th reunion at Chatham Bars Inn, Chatham, Mass., the weekend of June 10.

For a longer and better column WRITE. — ALVIN GUTTAG, *Secretary*, Cushman, Darby and Cushman, American Security Building, Washington 5, D.C.; SAMUEL A. GOLDBLITH, *Assistant Secretary*, Room 16-325, M.I.T., Cambridge. Mass.; MARSHALL D. MCCUEN, *Assistant Secretary*, 4414 Broadway, Indianapolis 5, Ind.

'41

Ted Walkowicz has been named to the board of directors of the Cornell Aeronautical Laboratory in Buffalo, N.Y. A member of the L. S. Rockefeller staff of Rockefeller Brothers, Inc., of New York, Ted has also been, for several years, a leading advisor to the federal government and the armed forces on matters pertaining to aviation. He participated in the Hoover Commission study in 1954-1955, was a member of the Budget Bureau's Aviation Facilities Study Group in 1955-1956, and from 1955 to 1958, he was a consultant to the special assistant to the President on disarmament.

Ed Weinberger is head of the computational analysis center for Gulf Oil in Pittsburgh, and has contributed to many of the company's computer operations, among them payrolls and monthly payments of royalties to holders of oil-producing land. . . . Expert after-dinner speaker Leona Norman Zarsky spoke on "Spark Plugs for Ailing Hearts" at a recent meeting of the women's auxiliary of the Middlesex West District Medical Society in Natick, Mass.

Phil Fresia is the proud father of a son, Robert Edward, born January 7, in Milan, Italy. — IVOR W. COLLINS, *Secretary*, 9 Sunnyside Drive, Dalton, Mass.; HENRY AVERY, *Assistant Secretary*, Pittsburgh Coke and Chemical Company, Grant Building, Pittsburgh 19, Pa.

'42

Somewhat more recently than most class members, I have become concerned with the nature of public school education. Even though we know that some of the Boston suburbs including ours have highly rated school systems, we do feel that ours could be better. It seems reasonable to Sandy and me that our children and our neighbors' children are capable of more effort and more achievement than is being asked of them. The conditions necessary to provide better education in English composition, foreign languages, and the sciences in high school have been outlined in the Conant Report. It may well cost more money. With the present teacher salary structure we find some of the more able people leaving our schools. Raising the school objectives and raising salaries are major projects calling for community agreement on goals, on the methods of attaining these goals and on securing support for the necessary tax increases.

By using this column to state a personal view I solicit ideas and, better still, records of goals attained. Next month I shall report on the steps Belmont has taken which we find particularly encouraging.

A special report of Haloid Xerox, Inc., of Rochester, N.Y. includes a photograph of Robert Vyverberg, manager of new product evaluation. After graduating with us, Bob went on to the University of Rochester for his S.M. . . . Walter R. Tower, a senior engineer in the research radar engineering department of the Sperry Gyroscope Company, is the senior author of the paper, "Radar Video Enhancement by Storage Techniques," which appeared in the September 1959 issue of *Electronic Digest*.

Changes of residence this month have been noted for: Colonel Richard C. Gibson to the Air Force Academy in Colorado; James Girdwood to McGraw-Hill Publishing Company in New York; Walter M. Kneeland to Melrose, Mass.; John T. Carleton to Tonawanda, N.Y.; and Robert R. Imsande to Mt. Vernon, Ind.

It was spring-like today in Boston. We hope it will really be warm and sunny for good gardening when you read these notes with the best wishes from — ED EDMUNDS, BOB KEATING, J. J. QUINN and LOU ROSENBLUM, Tech/ops, Burlington, Mass.

2-'44

Ran into Bruce Kingsbury at the M.I.T. Faculty Club. He reports that he is with Educational Services, Inc., in Watertown, Mass. Educational Services is the organiza-

tion that does research on new types of presentations and has been written up in many of the popular magazines. Bruce has three boys and lives in Wayland, Mass. . . . A couple of interesting address changes showed up, one indicating that Richard F. Garrard has moved from Phoenix, Ariz., to Bethesda, Md., and the other that Bill M. Lustberg has moved from Stamford, Conn., to Encino, Calif. Good luck to both of you in your new locations. Drop me a line and tell me what the moves mean.

Saw Frank K. Chin in Brookline the other day, and he advises that he is with Associated Engineering along with Lou Demarkles and Newton Teixeira. They are in the business of making patch cords and each one of them has been with the company since its founding. Frank said that he sees Andrew F. Corry quite regularly, since Associated Engineering is a customer of Boston Edison, and Andy is with the latter. Frank also ran into Ray O'Brien about a year ago when Ray had just moved to Massachusetts. Ray is with Calso, marketing lubricants and living in Southboro.

A note arrived from Bill Scott stating that he was leaving Texas Instruments and starting out on his own as Scott Technical Sales. I am certain he will be happy to hear from anyone interested in representation in the Texas-Oklahoma area. Some of you may recall that Scotty was awarded a prize as the man who came the longest distance to the 15th reunion. The prize was a special flask. Scotty advises that he uses it every chance he gets, and that it really does the trick in Texas where you can't buy mixed drinks.

While at Raytheon, recently, I saw Frank Carey who lives in Lexington, Mass., with his wife and two daughters. He has been with Raytheon about three years in their Basic Research Labs, though he says he is more in the business end of research than in pure research. He mentioned that Henry Alden moved to Los Angeles three years ago where he is working for Jet Propulsion Labs, and is happy and still single. — PAUL M. HEILMAN, *Secretary*, 66 Central Street, Wellesley, Mass.

'45

During the past month we have received reunion reservations from Bill and Jayne Humphreys, Ray and Jean Pelley, Warren Miller, Hart and Blanche Kircher, George and Betty Bickford, Bill and Jeanne Martin, Charles and Nancy Hart, Bob and Anne Maglathlin, Hal and Lois Thorkilsen and Ray and Pam Elmendorf. Bill McKay reported on January 30 that we had received 83 answers to our original special class mailing of early December. Seventy classmates have paid dues, while 49 have indicated they plan to attend the reunion with an additional 7 listing themselves as possibilities. The questionnaires received will be source material for future class notes but it will not take long to run through the 83 received so far. Unless you want me to fabricate about your why and whereabouts, I would suggest you return your questionnaire!

Within the next several days the second reunion flyer will be in the mail. Towards the end of March formal registration, travel instructions, and so forth, will have been forwarded to those '45ers expecting to attend the reunion. Did you receive yours? If not, drop Bill McKay, 6 Robert Road, Framingham, Mass., or myself a note, for we will be pleased to accept your reservations. The more the merrier and we expect to be merry.

Chick and Helen-Marie Street were in New York for the boat show in mid January. Fran and I spent an evening on the town with the Streets doing various bars, night clubs, and what have you. I can assure you a good time was had by all. . . . As previously reported, Tom and Betsy Hewson are in the area now, residing in New Canaan, one town up the line from Stamford. I've talked with Tom several times and expect to see him some time this week. Tom and Betsy have seen Jim and Ellen Brayton who live up a bit farther in Weston, Conn. . . . Frank Donohue has left Nestle's in Fulton, N.Y., for a new position in greater Boston.

The Navy, ever faithful to tradition, continues to move our XIII-A associates about with Captain Ralph Gerber now acting as naval attaché in Buenos Aires. Even Bostonians move! . . . Dave Flood has moved within the limits of little old Natick. . . . Two former wearers of the T have moved — Hal Thorkilsen from Lakewood to Hillside Drive in Denver, and Jim Hoaglund to 2949 North 22nd Avenue, Phoenix, Ariz. Hal and Jim are planning to be at Snow Inn, Harwichport, June 10-12. Are you? — CLINTON H. SPRINGER, *Secretary*, 420 Lexington Avenue, New York 17, N.Y.

'46

The mails have been noticeably lacking in correspondence this past month, so this column is necessarily abbreviated. I hope you will drop me a line to help me on the last issue of The Review this year or to assist us in kicking off next year's first issue with a bang. . . . Mac E. Van Valkenburg has been on the speaking circuit recently. He spoke on "Design of Transistor-RC Filters" at the Western Society of Engineers meeting held in January. Mac received his B.S. (electrical engineering) degree from the University of Utah in 1943, his M.S. from M.I.T. in 1946 and his Ph.D. from Stanford University in 1952. From 1943 to 1945 he was a staff member at the M.I.T. Radiation Laboratory and from 1945 to 1946 he served as research assistant at M.I.T.'s Research Laboratory of Electronics. He was an assistant professor at the University of Utah until 1949, acting instructor at Stanford until 1951, associate professor at the University of Utah until 1955, and is now a professor at the University of Illinois.

Seward Kennedy writes a nice note to bring us up to date on his recent activities: "I have been counsel for the last four years to Socony Mobil Oil Company's international division. You may recall, that before that I was with a Wall Street law firm for about five years. The present job is exciting and hectic and I love it. In the last year I have been on business to the Bahamas, four times to Europe covering most of the major cities, and just recently to the Barbados. I don't see many classmates but Sue and I get together with Jim Mulholland'44 and his wife, and Cliff Woods and his wife fairly often. Would love to have anyone call when they are in New York — Ox 7-4200. In addition to enjoying most of the great things New York has to offer like theaters, restaurants, museums, cocktail parties, and so forth, Sue and I manage to go skiing weekends in the winter and to Cape Cod on vacation in the summer. I also still enjoy playing golf, although I don't break 90 very often. Hope to attend the reunion in 1961 and see everyone there." Seward's business address is 150 East 42nd Street New York 17, N.Y.

A letter was received from Bill and Mary Jackson who live at 910 North 27th Street, Allentown, Pa. Bill has just been elected vice-president — division manager of Bonney Forge, Allentown, Pa., manufacturers of high pressure pipe fittings. He has also developed several new fittings which are now being used in nuclear submarines, atomic research vessels, missile launching systems, and many high stress industrial piping systems. Bonney Forge is one of two divisions of Bonney Forge and Tool Works; the other is in Alliance, Ohio. He is looking forward to the reunion, next year. That winds it up for this month. Thanks to Seward, and Bill and Mary for their letters. Let's have some from the rest of our large reading public. — JOHN A. MAYNARD, *Secretary*, 15 Cabot Street, Winchester, Mass.

'49

An article from the Wakefield, Mass., *Independent* says that William M. C. (Bill) Lam gave talks before groups of the Illuminating Engineering Societies in Orlando and Sarasota, Fla., in November. His theme — "Light is what you see as well as what you see by — therefore, in the visual sense, light is architecture." Bill is designer-président of Lam, Inc., manufacturers of Modulume, a versatile system of ready-to-install structural lighting for architectural specification. He also teaches at the Boston Architectural Center.

From New York in December, an announcement of the engagement of John Swift Anderegg, Jr., I, to Hope Ingersoll. Miss Ingersoll is an alumna of Radcliffe College and the Nursing School of the Massachusetts General Hospital in Boston, where she is a member of the faculty. John is now president of the Dynamics Research Corporation of Stoneham.

A Raytheon release notes that George C. Smith, Jr., X, has been transferred to the semiconductor plant in Lewiston, Maine, as manager of plant process engineering. He previously served in this capacity at the company's plant in Newton and Brighton, Mass. He has been with the semiconductor division in various engineering capacities since 1952. Married to the former Ardith L. Zervas. They have two girls ages six and two.

A letter from Earl W. Eames reports the arrival of a son, Erik Michael, on January 26. There are two other children — a daughter four and another son two. Earl

describes his new home as follows: "We have recently moved to 153 North Avenue, Weston, a large Victorian monstrosity which we dearly love. The kids are beginning to enjoy all the secret and intricate passages of the rambling structure, and after a coat of paint and some new storm windows, we'll have quite a wonderful house I think."

We continue below with the responses from last spring's questionnaires. Again a reminder that present tense refers to late spring, 1959, and very likely many details have changed since. For example, Archie Harris is now with Raytheon as manager of the marketing planning department for the equipment divisions, having left Arthur D. Little, Inc., early last fall.

Horton R. Shaw lives at 39-20 Greenpoint Avenue, Sunnyside 4, L.I., N.Y. He received his B.S. in Course XIII and an LL.B. at New York University in 1955. He has held four jobs since graduation and is now an attorney for the M. W. Kellogg Company giving them general legal advice of a corporate, labor, and contractual nature. He is married to Martha and they have two sons, three and a half and ten months. They live in an apartment in the city.

John B. Stevens, IX, 131 Linden Street, Coopersburg, Pa., has been working for the Bethlehem Steel Company since graduation and is at present temporarily assigned as superintendent of the pattern shop. His duties here include management of the shop with 80 personnel making patterns for five foundries. Married — Anna. Children — three, girls nine and seven and a boy five. They have their own home in the country.

J. T. Toohy, XV-A, lives at 21 Hillside Place, Rye, N.Y. Now an assistant branch sales manager for International Business Machines Company, he assists in the management of the branch sales office responsible for the sale of computers and punched card machines in downtown New York. He is married (Mary) has two children (girls six and two) and lives in his own home in suburbia. He has held two jobs since graduation.

William F. Troy, Jr., 92 Lake Shore Road, Brighton 35, Mass., received a B.S.E.E. in Course VI-A, Option 4, and, simultaneously, an M.S. in electrical engineering and business administration (no special course). He is project engineer at Raytheon (Wayland Labs); is group leader on the Hustler Project, airborne radar department; responsible for reliability, data, weight, and change documentation for Hustler Search Radar. He comments that for eight years following graduation, he ran his own business in Brookline, Mass., designing and equipping supermarkets. Lost business due to extended illness. Decided to use education to get going again in electrical engineering until health fully recovered. Married (Isabel), two children, boy four, girl two. Owns home in urbia. Has held three jobs since graduation.

Vernon Palmer Turnburke, Jr., XV-A, lives in McLean, Va. (P.O. Box 222). He is a systems analyst for IBM, assisting in the sale, installation, and programming of large scale digital computers to various branches of the U.S. government. Married (Marilyn), two girls, three and a half and three weeks. Owns home in suburbia. Has held three jobs since graduation.

Robert S. Walton, XVII, lives in Monterey, Calif. (Box 281). He is a structural engineer and designer with an architectural designer, commenting that "this is the job that I have wanted to attain ever since I was 13 or 14 years old." Has 12-year-old twin girls. Pets: infinite number, including squirrels, deer, mosquitoes, earwigs, sowbugs, flies, spiders and gophers. Rents home in the country. Has held three jobs since graduation.

Thomas E. Weil, XV, lives at 3137 Chadbourne Road, Shaker Heights, Ohio. He is treasurer of the Vitreous Steel Products Company. Married (Doris), three girls, ages five, three, and three months. Pets: one dog, one parakeet. Owns home in suburbia. Has held one job since graduation.

Thomas "J" Whitlow, CDR, USN, lives at 7011 Catlett Street, Springfield, Va. He has a B.S. in Course VI, electronics, and holds another B.S. from the University of California at Berkeley in mechanical engineering. He is with the Bureau of Aeronautics, Washington, D.C., U. S. Navy; he is planning assistant to the assistant director for anti-submarine warfare in the avionics division under the assistant chief for research and development. Married (Mary Jane), two boys, ages eleven and nine. Pets: one cat and one parakeet. Owns home in the country. Has held five jobs since graduation.

Marvin D. Zimmerman lives at 28 Valley Road, Lexington 73, Mass. He has a B.S. in Course VIII, and an M.S. in physics, 1951. He is a physicist at M.I.T. Lincoln Lab, doing research on photoconductors. Married (Inez), two children, boy and girl. Owns home in suburbia. Has held one job since graduation.

Ernest "Ray" Barriere, VI, lives in Scotia, N.Y. (Box 255 RD #4 Rector Road). He is supervising engineer for General Electric Company, supervising a group responsible for the electrical and control engineering associated with the operation and testing of prototype nuclear power plants. Married (Jean), five children, two boys aged sixteen and eleven, three girls, aged thirteen, eight, and one. Pets: two dogs, one parakeet, many rabbits and chickens. Owns home in the country, Has held five jobs since graduation.

William C. Beaton, II, lives at 15 Joanna Place, Rahway, N.J. He is a process engineer for M. W. Kellogg Company, setting up computers for engineering calculations. Married (Cindy), three boys, ages eight, six, five. Owns home. Has held four jobs since graduation.

Alexander V. d'Arbeloff, XV-A, lives at 34 Fernald Drive, Cambridge, Mass. He is assistant to the president of Artisan Metal Products, Waltham, Mass. Bachelor (hunting). Has an apartment in urbia. Has held four jobs since graduation.

John J. Collins lives at 617 Heston Road, Glassboro, N.J. Received a B.S. in Course XIV; an M. A. (1955) in sociology of labor from the New School of Social Research. He is a technical sales engineer for Shieldalloy Corporation, in charge of sales of so-called "rare" metals such as columbium, tantalum, boron, vanadium. Married (Catherine), two children, boy two and a half, girl five. One cat. Owns home in the country. Has held seven jobs since graduation.

David K. Hardin lives at 909 Chippewa Lane, Wilmette, Ill. He received a B.S. in Course II, Option I and an M.B.A. in marketing from the University of Chicago (1950). He is executive vice-president of Market Facts, Inc., and administrates major accounts. Married (Diane), one girl age one. One dog. Owns home in suburbia. Has held one job since graduation.

Archie H. Harris lives at 16 Country Club Road, North Reading, Mass. Received a B.S. in Course XIV, Option I, and an M.B.A. in business administration from Boston University (1959). He is budget director for Arthur D. Little, Inc.: preparation and control of company operating plan, short- and long-term forecasts; consultant on research and development management problems. Married (Audrey), two children, boy eight, girl seven. Pet: one dog. Owns home in the country. Has held seven positions in two companies since graduation.

Russell B. Hawes, VIII, lives at 86½ Concord Street, Nashua, N.H. He is engineering manager for Sanders Associates, Inc., having direct management of various military research and development programs. Married (Constance), one girl one and a half. Pets: three cats. Rents home in suburbia. Has held three jobs since graduation.

Thomas L. Hilton lives at 213 Rockingham Road, Pittsburgh 38, Pa. He received a B.S. in Course XIV, human relations, and a Ph.D. in education from Harvard (1955). He is assistant professor of psychology, Carnegie Institute of Technology, teaching psychology and research in executive development. Married (Alice), three children (boys ages eight, five, one). Pets: one cat, one rabbit, 50 tropical fish. Owns home in the country. Has held five jobs (all academic) since graduation.

Lawrence Holt, II, lives at 75 Stratford Road, Melrose, Mass. He is northeast district sales engineer for Niagara Blower Company, selling air engineering products in New England. Married (Jane), three children, boy six, two girls, seven and one and a half. Owns home in suburbia. Has held two jobs since graduation.

Robert E. Hughes, XV-A, lives at 894 Caledonia Avenue, Cleveland Heights, Ohio. He is corporation president for Graham Road Property Corporation. Married (Frances), four children, one boy four, three girls nine, six and a half, and a half. Pet: one cat. Owns home in suburbia. Has held three jobs since graduation.

William R. Jones lives at 100 Memorial Drive, Cambridge, Mass. Received a B.S. in Course XV-1, Option A. Has taken various night school courses since then. He is assistant to the president of Polaroid Corporation, and is treasurer of the Scientific Engineering Institute. Bachelor (hunting). Has window box in which a mint patch, six tomato plants, and one stalk of corn flourish. Owns home in the country in the mountains, and has apartment in urbia. Has held three jobs since graduation.

Robert L. King, XV-A, lives at 1 Day Avenue, Danvers, Mass. He is the proprietor of King Vault Company, manufacturing and installing concrete burial vaults. He comments that Course XV-A

was ideal training for attitudes necessary to operate a small business. Married (Connie), one boy of two and a half. Owns home in suburbia. Has held three jobs since graduation.

Jeremy B. Lewi lives at 12733 Appleton Way, Los Angeles 66, Calif. Received a B.S.E.E. in Course VI-A, Option 3; Master of Engineering from U.C.L.A., engineering executive program, June 1959. He is chief, technical operations staff, for Packard-Bell Electronics Corporation, co-ordinating all proposals and estimates for military electronics work; responsible for division procedures and policies. Married (Marjory), two girls, ages three and one and a half. Owns home in suburbia. Has held two jobs since graduation.

Harold A. B. McInnes, II, lives at Marshall Terrace, Wayland, Mass. He is factory manager at Tracerlab, Inc., directing the operating of part of the manufacturing division, including production control, machining, assembly and process manufacturing departments. (In process of changing jobs). Married (Sally), three boys, seven, five, and two. Owns home in suburbia. Has held two jobs since graduation.

George H. R. McQueen, XV, lives at 8 Woodland Drive, Framingham Center, Mass. He is industrial engineer for Polaroid, setting up methods and establishing layout for new products. Involved in decisions on tooling and material handling. Married (Peg), two children, boy eight, girl six. Owns home in suburbia. Has held three jobs since graduation.

Thomas Moranian lives at 19 Penwood Road, Livingston, N.J. Received a B.S. in Course XV, Option II, and M.B.A. and D.B.A. from Northeastern University, 1953 and 1959, respectively. He is professor in industrial management at Rutgers University, teaching factory planning and operations control, organization theory, and business policy. Married (Lillian), girl six and a half. Owns home. Has held two jobs since graduation. — FRANK T. HULSWIT, *Secretary*, 14 Nadine Road, Saxonville, Mass.

'50

The 10th reunion of the Class is front page news as you must surmise by reading the committees' publicity releases. It's going to be a really, really good show at the Hotel Curtis in Lenox, Mass., on June 10, 11, and 12, when the Class of '50 salutes the 50th state. The Hawaiian theme will be prevalent all weekend and I suggest you register early. A partial listing of people who are planning to attend follows: Charles Levy, Frank Parisi, John Nickerson, Syed Alvi, Jay Bedrick, Bill Enders, Frank Ferrigno, Jack McKenna, Jack Mohr, Bill Murphy, Nat Roossin, Hans Stern, Frank Ruccia, Pete Palmer, Jim Jensen, Pete Baker, Marty Andonian, Ed Reidy, Charlie Govatsos, Ken Fertig, Mal Green, Jack Weaver, Bob Mann, Bob Cesari, Maggie Coleman, Phil Byrne, Dave Levington, Don Miller, and Mariano Romaguera. Are you coming too? Start making plans now.

Ozzie Kincannon writes the following summary of his doings these past 10 years: "Despite my vows to the contrary when Tech and I parted company, I eventually found my way into a traveling job — as a sales and service engineer for the paper makers chemicals department of Hercules Powder Company. I joined Hercules in late 1951, after spending a year with a fine paper manufacturer near Philadelphia. After training assignments in Wilmington, Del., and Kalamazoo, Mich., I started traveling in the upper Midwest, with headquarters in Milwaukee (the Braves followed me there!). A year later it was back to Wilmington and then in May, 1954, to New Orleans, my home for the last five years. Home actually covers a lot of territory — Louisiana, Arkansas, Mississippi, Texas, west Tennessee, and Mobile, Ala., to be precise — for I'm still single and spend most of my time on the road. There are four of us in New Orleans and we work only in paper mills and related industries, so the amount of traveling involved is not as much as the geographical limits of the territory might indicate.

"There aren't many Tech men down here, possibly the result of a 'Yankee go home' campaign originated in 1861. As a former Mississippian, I have been accepted as a Rebel and am even acquiring a slight drawl. Others from our Class who qualify as southerners are Joe Fleming, in New Orleans, St. John Garwood in Houston, Texas, and Amiel Brinkley, Jr., in Mobile . . . Brink has been with the research laboratory of the southern Kraft division of International Paper Company since leaving Tech. He's been doing a lot of their work on pulping and bleaching. He's married to the former Katherine Hamilton of Mobile, and he and Kit have two daughters . . . Saint entered law school at the University of Texas after graduating from Tech and is now practicing law with one of the larger firms in Houston. He married the former Jean Forsyth and they have two sons. I haven't met any others from our Class who live down here, though I bumped into Jim McKittrick in Beaumont a few years ago. He's with an electronics firm in California."

Ken Olsen was honored as the "Outstanding Young Electrical Engineer of 1959" by the Eta Kappa Nu national electrical engineering honor society. Ken is president of Digital Equipment Corporation, a Maynard, Mass., electronics firm. He and a close associate, Harlan Anderson'53, founded Digital Equipment in September, 1957, as a manufacturing operation specializing in products for the digital computer field. Their basic products were very high speed computer circuit packages for the design, construction, and testing of computers and computer type systems. These product lines have since been supplemented with high performance digital systems designed and built in the Maynard plant. Ken's accomplishments include the invention of numerous devices for use in digital computers.

In 1952 he was the leader of the team at M.I.T. Lincoln Laboratory which designed and built the first digital computer to utilize the now commonly used magnetic core memory. The unusual speed with which this project was completed led to his assignment as "idea man" in the SAGE air defense computer design program conducted jointly by M.I.T. and IBM. He was resident technical representative at IBM in Poughkeepsie and Kingston, N.Y., during the final year of the SAGE computer prototype construction. Upon his return to Lincoln Laboratory, he was given the job of building one of the first high speed, high performance digital computers made with transistors instead of vacuum tubes. Ken lives in Bedford, Mass., with his wife, the former Aulikki Valve of Lahti, Finland, and their three children, Ava Lisa, seven; Glenn, five; and James, one. As a matter of fact, Ken is now a neighbor of mine. Ruth and I have just purchased another house and it happens to be across the street from Ken. So henceforth direct your news to 26 Hilltop Drive, Bedford, Mass., and I'll strive to get your comments into print.

It is with regret that I have to report the passing of Roy Holloway. I didn't get to know Ray at school but all the residents of Westgate and Westgate West will remember him. He was with Bemis Brothers Bag Company in Texas until a year or so ago, when he moved to Peoria, Ill., to head up his own firm. Ray was 38 and is survived by his wife and three children. — JOHN T. WEAVER, *Secretary*, 26 Hilltop Drive, Bedford, Mass.

'51

Your class secretaries are frustrated by the lack of news available for this column. Our saving grace has been a newsclip agency. The shortness of the present column we hope will attest to the need for more of you to drop us at least a postal card of information.

Society editors have supplied us with the news of marriages. Last August Donald Terp and Beverly Betts were married in Bellows Falls, Vt. . . . In November, Ara Shrestinian and Virginia Yeterian were wed in Haverhill, Mass. Ara is currently with the Thompson Lictner Company. . . . In December, John McCarthy exchanged vows with Jeanne O'Sullivan in Woburn, Mass. . . . Also in December Dean Boorman and Penelope Probert were married in South Orange, N.J. Dean is with the Mayor's Special Adviser for Housing and Urban Renewal in New York.

Norman Telles received a master of science in radiation biology from the University of Rochester last June. . . . John DeWitt was promoted in January to the rank of captain in the Air Force. After a stint with Boeing in Seattle as production engineer, John entered the U.S.A.F. in 1955. For a while he was stationed at Wright-Patterson, and last September he was assigned to the ballistic missile division in the training equipment division. John is married to the former Kay Barnes of Kennewick, Wash. They have one daughter, Heather Ann, who is one year old. . . . David Grossman, a planning consultant with Blair Associates of Cambridge, is now on a contract with the North Station Merchants Association of Boston. He will supervise a comprehensive physical and economic survey of the area plus a master plan for its redevelopment.

Besides this project David serves as consultant to the Southeast Massachusetts Regional Planning District — RICHARD W. WILLARD, *Secretary*, Box 105, Littleton, Mass.; ROBERT S. GOOCH, *Assistant Secretary*, 407 Danciger Building, Fort Worth, Texas.

'52

And still the letters and filled out questionnaires come in with the mail — have we heard from you recently? Art Freeman writes that he is with Ordnance Materials Research Office in Watertown, Mass., as a research physicist doing basic research in solid state physics (Ph.D, M.I.T., June '56) and also is with M.I.T. as a guest of the Physics Department. Art received national attention from a paper given at the American Physical Society meeting, March, 1959, with attention from the *N.Y. Times, Time,* and *Business Week*. Art and wife and sons Jonathan and Seth now living in Newton. . . . Dick Wingerson is working for his doctorate at Tech in nuclear engineering. . . . John B. Mattson, Jr., is at Harvard Business School having received his masters in nuclear engineering from Tech. John was married in June 1959 to Nancy Wilburn.

Dana Mayo is at M.I.T. as the National Institutes of Health Postdoctoral Fellow (Chemistry Department) and has given several papers in the last year to the American Chemical Society in Boston and the 10th Annual Spectroscopic Symposium in Chicago. . . . John F. Maxwell, Jr., after taking his M.B.A. at Tuck, Dartmouth, and working for two years as technical assistant to the president of the Northwest Paper Company in Cloquet, Minn., has returned to M.I.T. in the Industrial Liaison Office. . . . John T. "McLellan" Fitch is with WHDH radio and TV as those of us in the Boston area know. John also writes a bi-weekly column "The Jazz Seene" for the *Boston Traveler,* and when not spending time in Concord with his family of five (sixth on the way) is narrating or emceeing at jazz lectures, concerts, and so forth.

Barnett B. Berliner is an architect and planner with Soep and Berliner in Boston, department and retail store specialists, and is also teaching at Boston University. . . . From Raytheon in Waltham comes news from Curtis M. Hellenbrand, project section head at the lab for applied research for cross field devices, who delivered a paper on the development of a multi-megawatt L-band amplitron used with F.A.A. air traffic control radar, at the PGED meeting in Wash, D.C.; Paul Corbiere, senior design engineer in industrial apparatus division designing pulse components and in his third year at Northeastern, for a masters in electrical engineering; and Harold Roth, physicist, research staff member.

John F. Clemons is at Mount Holyoke College in South Hadley, Mass., as engineering assistant to the superintendent of buildings and grounds. He just announced his second daughter, Jeannie, born in October. John mentions seeing Dick Aquadro in Northhampton, Mass., and Ray Loomis from Windsor, Conn. . . . Ray is a partner with his brother in their engineering and architectural firm. . . . Also in Windsor Locks is Bob Jeffery, who is a project engineer in charge of hydraulics with Hamilton Standard Division of United Aircraft Corporation. No payola involved, but Bob mentions that they are looking for some good hydraulics engineers.

Bob King is living in Wayland, Mass., and is the northeastern technical representative of filter products division, Johnson and Johnson (Chicago). He is involved in sales engineering for industrial filtration and new market development in custom engineered non-woven fabrics, driving 40,000-50,000 miles per year around New England, New York and New Jersey. Bob is active in the M.I.T. Alumni Council, and the American Marketing Association. . . . Joseph Rubinovitz is with RCA in Burlington, Mass., as a senior member, technical staff, and has just moved into a new home in Framingham with Miriam, Harvey, and Ronald. . . . Roger Borden is an assistant professor of mechanical engineering at Worcester Polytechnic Institute, and is living in Newton Center.

From Washington, D.C., Leith Holloway writes he is with the U.S. Weather Bureau in Suitland, Md., doing research in numerical weather prediction, calculating the next storm on an IBM 704. Leith is also vice-president of the National Capital Astronomers. . . . Al Blackburn is also in Washington, at the Pentagon as special assistant to the assistant director of research and engineering for strategic weapons, in the Department of Defense. (Anyone have a longer title?) Al writes further: "Recently completed the F-100 ZEL program as engineering test pilot for North American Aviation. Made 16 such launches including the first from an atomic blast shelter, and the first at night. Also completed term of office as president of the Society of Experimental Test Pilots which sponsored a scholarship initiated at M.I.T. for a student entering his junior year in the Department of Aeronautical and Astronautical Engineering."

Lt. John E. Wesler is also in Washington as a commissioned officer, project officer in aids to maritime navigation, presently assigned to the civil engineering division, U.S. Coast Guard. . . . Very interesting letter from David Ulrich in Coral Gables describing what sounds like a terrific job with International Petroleum Company, Ltd., as a manufacturing assistant, who co-ordinates activities of and provides information to the operating refineries in South America, and reports back as liaison to the executive offices. The job involved 20,000 miles of traveling in the last five months. . . . Keith R. Johnson is in Minneapolis working for Rem-Rand Univac in St. Paul as an application engineer, selling digital computers for military systems. . . . Richard Paul is with Linde Company in Tonawanda, N.Y., as a section engineer in charge of chemical engineering development work in the engineering lab. He writes that he attended the International Congress of Refrigeration in Copenhagen last August.

That's about all for this column; it is good to hear from so many, but there are still many long lost. In answer to several requests for information on specific classmates' addresses, my files are not always up to date, and I suggest that the M.I.T Alumni Office may be able to help out. — DANA M. FERGUSON, *Secretary*, 252 Great Road, Acton, Mass.

'53

Bits and pieces. Lloyd Hyman is making good use of his doctorate (in physics) at Brookhaven National Laboratory, Long Island, N. Y. . . . Rocco Mancini is a traffic engineer with Edwards and Kelcey (consulting engineers) in Boston. . . . Gene and Jennifer Richter announced the arrival of a daughter — Gwendolyn — this January. They are living in Shaker Heights, a suburb of Cleveland, Ohio. . . . T. S. Greenwood (M.S. in 1953 in electrical engineering) contributed an article entitled, "A Barrier-Grid Tube Memory," to the December issue of the Bell Laboratories *Record*. He joined the Laboratories in 1953 and has since been associated with the development of memory devices for the electronic switching system. Until this year he has worked on the barrier-grid store, the transient memory for the system. He is now in charge of a group developing its semi-permanent memory — the flying spot store.

Delos Brown, who received his Ph.D. in 1953, is the co-inventor of a U.S. patent just issued. The patent describes a method for preparing a titanium catalyst useful for polymerizing olefins. The invention is a result of research conducted at Humble Oil and Refining Company's Baytown, Texas, Research Center where Delos is a senior research chemist. He and his wife have two sons and two daughters and are living in Baytown. . . . Bob McDonald recently made Bill Cunningham's column in the *Boston Herald* and was a speaker at the 11th annual winter banquet of the Francis Ouimet Caddie Scholarship Fund (he was one of the original 13 scholars chosen in 1949). No more news. . . . *my mail bag is empty!* — MARTIN WOHL, *Secretary*, Room 1-131, M.I.T.

'54-G

In December, after completing my assignment in Columbus, Ohio, where I supervised the installation of an electroplating and finishing facility in the new Western Electric Company plant, I was transferred to the New York area where I am a construction estimating engineer for the Turner Construction Company. . . . Nolan Jones writes that his temporary field assignment in the "heart of Dixie" has been extended. He is with the MITRE Corporation in Montgomery, Ala., launching and controlling BOMARC missiles with SAGE, as well as conducting other SAGE test projects. He is scoutmaster of Troop 107 and has just completed 15-years' service as scout and leader in the Boy Scouts of America. Nice work, Nolan.

Lester R. Grohe was recently appointed chief engineer of components in the military products division of American-Standard at Norwood, Mass. He will head an

engineering group in a further expansion of the military products division's gyro development activity. Mr. Grohe was formerly assistant director of the M.I.T. Instrumentation Lab, and he is widely known for his work and leadership in developing gyroscopic and accelerometer components used in inertial navigation systems.

Clark P. Mangelsdorf was awarded a science faculty fellowship by the National Science Foundation. Congratulations! . . . Joseph I. Lisaius was promoted to the position of field and trade promotion manager for Schering Corporation in Bloomfield, N. J. . . . Wei Yuan joined the staff of Esso Research and Engineering Company in New Jersey. . . . Laurence I. Miller is a civilian meteorologist in the U. S. Weather Bureau's satellite research program at Suitland, Md. . . . Henry Hugh Rowe, Jr., is with the Institute as a mechanical engineer. He recently married Miss Audrey Mae Campbell of Quincy, Mass. They reside in Arlington.

This month's column utilized all the class news in my files. Please let me hear from you so that we can have future columns in The Technology Review. — NEWTON SHANBROM, *Secretary*, 44 Fleetwood Avenue, Mt. Vernon, N. Y.

'55

At this writing (mid February), returns are still pouring in from the first reunion mailing. Our response has been close to phenomenal, and if things get any bigger we shall need Fenway Park to hold the gang. First prize for distance goes to Rafael Morales, who hopes to be up from Bogota, Colombia. He writes that he was married in October 1958 to Lois MacOsborn of Louisville, Ky., and they have Ana Isabel who was born in August of last year. Rafael has his own construction company and does work in the oil industry.

Tom Thliveris takes second prize this month, hoping to come in from Ogden, Utah. After graduation from M.I.T., he worked for a Salt Lake City architect and two Ogden architects, besides teaching part time at night school at Weber College. He tells of his wonderful wife and two wonderful children, one of whom he hopes will be M.I.T. '78. By the time this is published, Tom should know the results of his Utah State N.I.C.A. exam for licensed architects.

Alan Dana is an intern in the medical service at Grace-New Haven Community Hospital, and will stay on next year as a first-year assistant resident. He and Dottie and daughter, Deidre, are now living in Branford, Conn. . . . Walt Shifrin is working as a sanitary engineer for Horner and Shifrin, Consulting Engineers. He is concerned with stream pollution abatement projects in the St. Louis metropolitan area. . . . Dick Dangel is working as an administrative engineer for the mechanical engineering department of Emerson Research Laboratories in the D.C. area. He was married in June 1958 to a University of Maryland graduate. Besides going nights to George Washington University for a master's in engineering administration, he is also taking jazz piano lessons on a regular basis.

Phil Gruber writes from Munich that his German fellowship is not any better paying than any other — but he hopes to be able to save up enough to pay for his ticket home. . . . Bill Nichols, S.J., will be ordained a Catholic priest on June 18, 1960, in the chapel of Weston College. His first Solemn High Mass and reception will be in East Cleveland, Ohio, on June 26, 1960. Best of luck to you, Father Bill. . . . Dick Rush hopes to come up to the reunion from Baltimore. He has been married for five years, and has two boys, ages four and two. After four years as a U.S. Air Force pilot, Dick is now with Bethlehem Steel Company.

Norry Hersey is sorry to miss the reunion, but can't make it back from Europe till next fall. He was married to an English girl in December 1959. . . . Dave deR. Norton writes that he was married to Beverly Bain of Westwood, Mass., August 1954 (nothing like recent news — Ed.) He received his M.S. in mechanical engineering at Tech in 1956 and worked for Lincoln Labs, Minneapolis-Honeywell, Uncle Sam (Army), and is now at the military products division of American Standard working on the design and development of inertial guidance components. Dave has a boy and a girl and is living in Norwood, Mass.

Sandy Goldman finally brought us up to date with a fine description of his philanderings on the continent: "I left the U.S. in August 1958 traveling to Delft, the Netherlands, on a Fulbright in electrical engineering. After taking in the Brussels World's Fair and a 'starter' week in Paris, I settled down to a year filled with fog and rain, Dutch gin, and the warmest, most hospitable people in Europe. My work was at the Technical University at Delft in experimental determination of Doppler shifts present in radio waves reflected from the ionosphere. My major accomplishment was learning Dutch and some Flemish and after eight months in a country without hills, I pedal a mean bicycle. During March I skiied in the Alps for two weeks, and followed this with trips through Belgium, England, France, and Switzerland. In the summer, my time was equally divided between Italy and Israel, which I can verify, is not the best time to see either of the two lands. It gets a bit warm there, and at the shore of the Red Sea, (Eilat) we experienced temperatures near 125°F. Oh yes, during the summer, my brother Leonard joined me and with my white Dauphine we 'did' Europe at 60 mph. See Europe by train, you future Fulbrighters!" Sandy is now back at Columbia University as an instructor in the electrical engineering department.

We dislike, just as you do, to see a gap in The Review where our class notes ought to be; so joyous is the day when someone sympathetic sends us a real gold mine of news. Such is the Phi Delt newsletter that Marty Gilvar and Barry Lucas compiled and were good enough to send on to us as well as to their brethren. Here goes: Barry lives in Bloomfield, Conn., and works in the naval reactors division of Combustion Engineering. He is still trying to "improve the mind," hoping to receive a master's degree in June from Rensselaer Polytechnic Institute. . . . Marty, who got his master's from M.I.T. in September, took his talents to the Morgan Construction Company in Worcester. He and Meg are living in North Grafton with offspring John Kenneth, who arrived last November. . . . A few of our classmates can't seem to tear themselves away from the great sources of knowledge. Charlie Prewitt is back at Tech again this year, having ventured into the research division of Raytheon last summer. . . . Both Dick and Helen McCammon have acquired doctorates, but Dick is continuing his studies at the University of Chicago.

Pete Pratt hopes to emerge in June with an M.B.A. from Stanford; meanwhile Jackie continues to teach elementary

Sloan Fellows

John Eberhard'59, who is associated with the Sheraton Hotel Corporation as director of research, is a member of the School of Industrial Management faculty, teaching a graduate course in the business environment. . . . Word of another Sloan Fellow who has reached the presidency of his company comes from San Juan, Puerto Rico. *Raul G. Mendez'55* has recently been appointed president of the Ochoa Fertilizer Corporation. Raul succeeds *Luis R. Gonzalez'12,* a graduate of Course XIV, who has become chairman of the board.

Ram Kirpalani'59, has written from Bombay, India, of his new position as manager for the international and import division of Blue Star Engineering Company (Bombay) Private, Ltd. . . . Another member of Kirpalani's class who is now in India is *Jan O. Guthe,* who has been assigned by the Swedish Match Company to their office in Bombay. They hope to meet Dean Emeritus E. P. Brooks and other members of the School of Industrial Management and Department of Economics faculty who will be conducting management conferences in India this summer.

Announcement has been made of the advancement of two members of the Sloan Class of '56: *Harry W. Buchanan, III,* has been elected a vice-president of Metal and Thermit Corporation, and *Wiley S. Robson* has been appointed assistant director of sales administration of Eastman Kodak Company at their headquarters in Rochester. . . . *William W. Heilman'51,* has been named Niagara plant manager of Union Carbide Metals Company.

Effective March 1, *John C. Kelly'58,* became assistant regional general manager, Southwestern region of Continental Oil Company. . . . *Alan W. Sampson'59,* is the new manager of Shoe Machinery marketing for the United Machinery Corporation. . . . *Andrew E. Burnett'41,* operating manager of Southern Electric Generating Company, was recently elected a vice-president of his company. — JOHN M. WYNNE, Room 52-455, M.I.T.

school in Menlo Park, Calif. Last summer Pete worked for IBM in their summer program, dividing his time between Endicott, N.Y., and the Bay area. . . . On the other end of this education business is Don Montgomery, who has been teaching metallurgy in night school. By day Don is a part of the Dyna-Soar project at Boeing in Seattle. The Montgomerys have two children, the latest addition a girl. . . . Still wandering apparently, allegedly in search of employment, is Gordie Cultum, who arrived in Europe thanks to the U.S. Air Force. Having thrown off his military shackles, Gordie continued to pursue the finer things in life on the Continent (and the British Isles) and was scheduled to join forces in October in Munich with Tom Gale, another European wanderer.

Pete Peterson was released from the Navy in late 1958, and he, Nancy, and their two boys are making their home in Long Beach, Calif. Pete is a sales engineer in the Los Angeles office of Minneapolis-Honeywell, having arrived there last spring after a couple of training courses in Cleveland and Minneapolis, en route. . . . Barry did some personal checking-up on Tom and Joyce Hamilton, visiting them and their two boys in Anniston, Ala. Tom is managing operations for the family enterprise, the pipe foundry. That's all from the Phi Delts, but quite a lot; again many thanks to the authors!

A few other items: Jim Duguay was married last October to Charlotte Haverstick of Baltimore, a medical secretary who graduated from the College of Notre Dame of Maryland. Since their wedding trip to Bermuda, the Duguays have lived in Baltimore, where Jim is an industrial engineer in the air arms division of Westinghouse. . . . Ellen Dirba, too, merits congratulations on her marriage in December. Unfortunately, Ellen's Christmas greetings, amid excitement over the joys of married life and this wonderful man and the home they are building in Aspen, Colo. (Ellen-designed, of course), failed to reveal her new name! . . . Tommy Doherty's Christmas card divulged that he is with Architect's Collaborative in Cambridge, where he is doubtless involved in very interesting projects. Well, it's good to be using up some printer's ink again. Hope to see lots of you folks at the reunion in June! — MRS. J. H. VENARDE, *Secretary*, 107 Mullin Road, Wilmington 3, Del.; L. DENNIS SHAPIRO, *Assistant Secretary*, 15 Linnaean Street, Cambridge 38, Mass. ELiot 4-4901.

'56

At the moment, your correspondent (P.B.) is frantically busy preparing lectures, grading papers, and trying to write his thesis. Consequently, this month's column will be an exceedingly brief one.

Easily, the most popular venture for Tech men to go into is marriage. This month, however, we have only one to report. In December of last year, Joseph Wauters married Carol Mae Dyer of Pelham Manor, N.Y. Carol is a graduate of Colby College, has a New York University master's degree in education, and is currently teaching school.

As far as new locations are concerned, there is also little to report. Harold Rothstein is employed by the American Appraisal Company in Milwaukee. . . . John Mansperger is out of military service after serving with the Air Force in the Pacific area. Now, I fear, the thesis calls me. — BRUCE B. BREDEHOFT, *Secretary*, 1528 Dial Court, Springfield, Ill.; M. PHILIP BRYDEN, *Assistant Secretary*, 3684 McTavish Street, Montreal 2, Canada.

'56G

Congratulations are due to three of our classmates. Assistant Professor of Chemical Engineering and the incumbent class President, Thomas Mix, and Miss Linnea Eva Kneller were married this past fall. Mrs. Mix is a Boston girl and attended Lasell Junior College. . . . Former Princeton varsity football player and graduate student in mathematics, Leslie Wilson, married Miss Hildegarde Willman. The Wilsons have moved to Berkeley, Calif., so that Les can continue graduate work at the University of California . . . Also married this past fall was John Martin Clancy, a graduate student in architecture. John took as his bride Miss Sylvia Carol Reid of Madison, Wis. Sylvia is an architect of professional standing herself, having been a student at Wisconsin and a graduate of the Yale School of Fine Arts and Architecture.

Chemical engineering scholar, Fedia Charvat, has moved to Williamsville, N.Y.; Lee C. Tait has moved to Washington, D.C.; mechanical engineer, Gunnar Ohlsson, has returned to his native land, Sweden; civil engineer, Captain Richard Harris, U.S. Army, is in Alexandria, Va. — CHARLES T. FREEDMAN, *Secretary*, 233 East 32, New York, N.Y.

'57

"Optimum Rocket Trajectories" is the title of a two-part article by Roger Barron appearing in the January and February issues of *Aero/Space Engineering*. . . . Bob and Donna Kruger have a daughter, Lorra-Kay. Bob has been working on his M.S. in Course II. . . . Bachelor co-eds are getting scarcer. Marianne Maguire is now Mrs. Robert Kerwin, and Iclai Sirel is now Mrs. Standish Hartman. . . . Bob Schmucker and Jean Glenn were wed in January. Jean graduated from Duke University and studied at Cornell Law School. Bob is chief metallurgist for the Harrison, N.J., division of the Crucible Steel Company.

Turgut Burakreis and Dorothy Robertson were wed in December. Dorothy graduates from Vassar this June. Turgut has finished his residence requirements for the doctorat des sciences politiques at the Graduate Institute of International Studies of the University of Geneva and presently is with IBM where he is working on his thesis. . . . Alex and Martha Bernhard are living in San Francisco. Alex is stationed aboard the *U.S.S. Perch*. . . . Bill and Ann Brandon had a son, William Campbell on November 15. Ann graduated last year from Wellesley. Bill is with Raytheon.

Doug and Alegra McIver have moved to Portsmouth, N.H., where Doug is with Sperry Rand. . . . Jack Safirstein and Susan Lasker are planning an August 7 wedding, with Bob Gal as best man and Jules Byron, Gerry Marwell, and Marty Goldstein as ushers. A Caribbean honeymoon is planned. Jack is with the advertising firm of Benton and Bowles.

Jack tells me that Bob Gal is busy opening new branches of Gimbels in New Jersey. . . . Jules and Elaine Byron are busy planning a family with an addition scheduled for delivery this summer. Jules is with his father's real estate firm of Irving Byron and Son. . . . Marty Goldstein and Gerry Marwell are both studying sociology at New York University with Gerry working on his Ph.D. . . . Don Aucamp is doing graduate work at Tech. — ALAN M. MAY, *Secretary*, 525 East 81st Street, New York 28, N.Y.; MARTIN R. FORSBERG, *Assistant Secretary*, 11 Scottsfield Road, Allston 34, Mass.

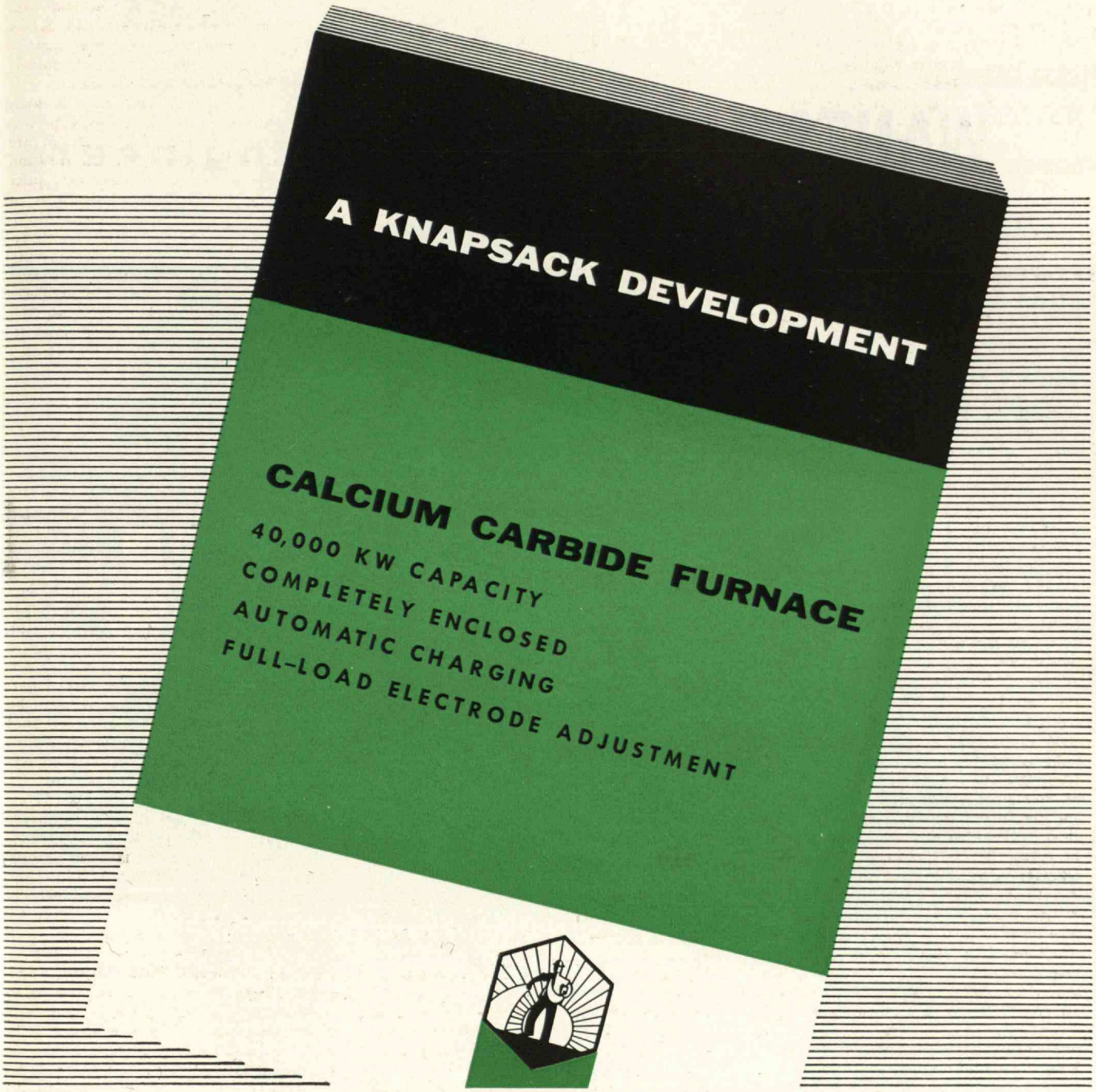
'59

It's spring, and all our fancies are presumably turning toward more pleasant thoughts. Rumor has it that many class members are taking on family problems. This should provide more than adequate material for future class notes. Please forward any info about our clan to me as soon as possible. . . . Just received the unofficial word that Bruce Blomstrom was about to be engaged. Best of luck to Bruce and Ann. . . .Received a card from Al Oppenheim recently. Apparently the sport of skiing has gotten a strong hold on many members of our Class. About 30 M.I.T. Alumni and faculty members spent weekends at Mont Tremblant.

Sheldon Buck is working on the reference research staff of the M.I.T. Instrumentation Labs. . . . Don Buckley is working with the energy conversion group on a research assistantship. . . . F. J. Cruz is with the Sulzer Company in Switzerland. . . . Ron Colier is working on his master's at Brooklyn Polytech. Last week Ron and I became ambitious and hopped a ride to Jacksonville, Fla. We spent two glorious days in the sun, before returning to school. . . . Dave Dayton and Stan Drozd are both with Ratheon, Inc. . . . A. V. DeStena is a project engineer at Foster Wheeler Corporation in New York. . . . Ed Doyle is at Hamilton Standard. . . . Ed Drake is with North American Aviation in Downey, Calif.

Dick Drossler, married last June, is working for Gillette in the marketing research department. . . . Alberto Dumas is home in Buenos Aires, working at ViPlastic. . . . C. F. Ellis is with the Air Force doing research work. . . . Frank Elwood is at Minneapolis-Honeywell in Philadelphia as a sales engineer. . . . John Fehan is with the California State Highway department in San Bernadino. . . . Paul Ekberg, I believe, is now working in Sweden.

I understand many '59ers are planning to be abroad this summer. Please send me details. — ROBERT A. MUH, *Secretary*, 8 Merrivale Road, Great Neck, N.Y.



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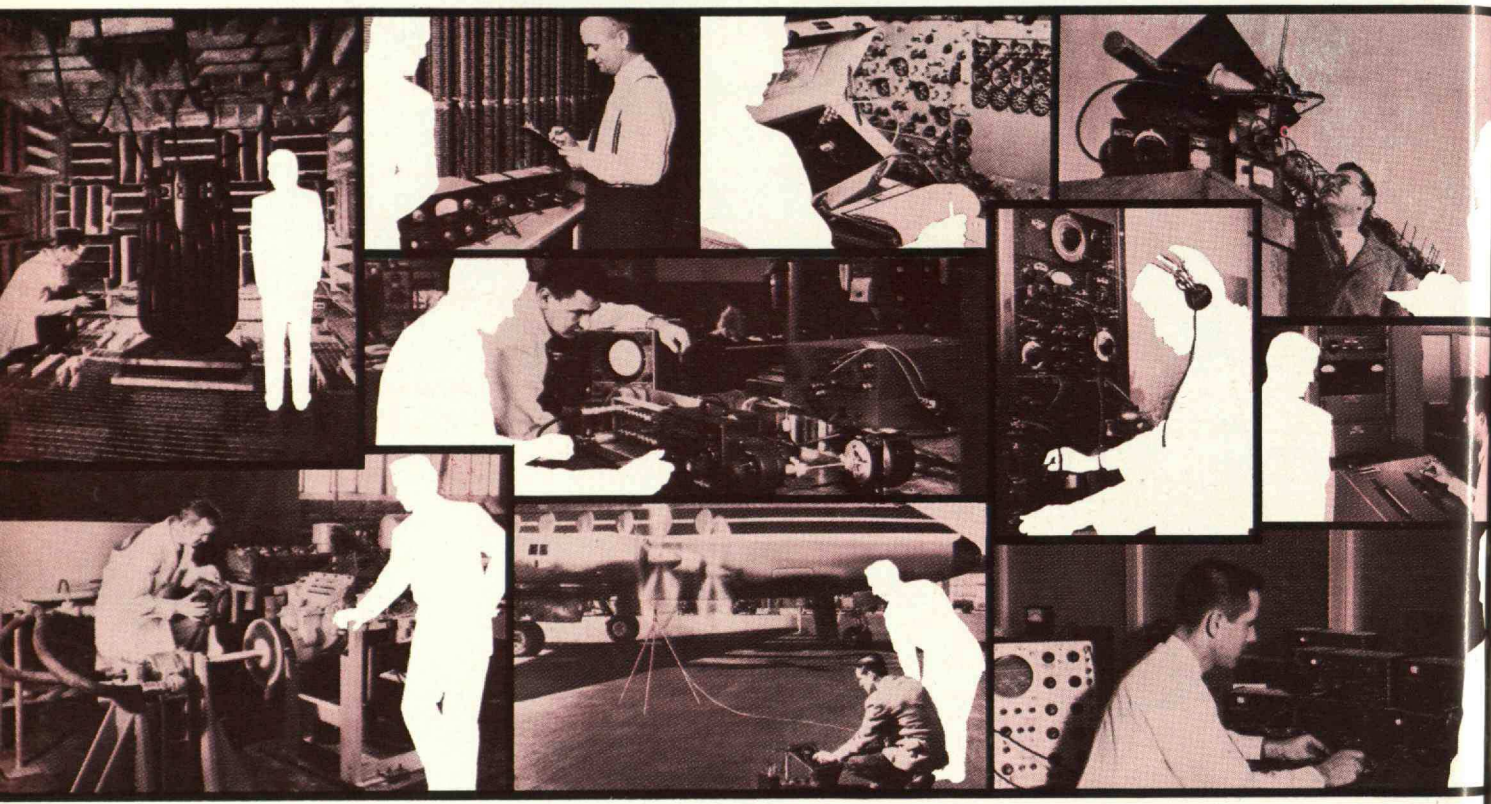

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